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April 19–24, 2015 • Mandalay Bay • Las Vegas, NV

Lab Guide

Orchestration 203:

Cloud Provisioning

Aaron Dixon & Ben Yukich

Default Login / Password:

admin / Knowledge15

itil / Knowledge15

employee / Knowledge15

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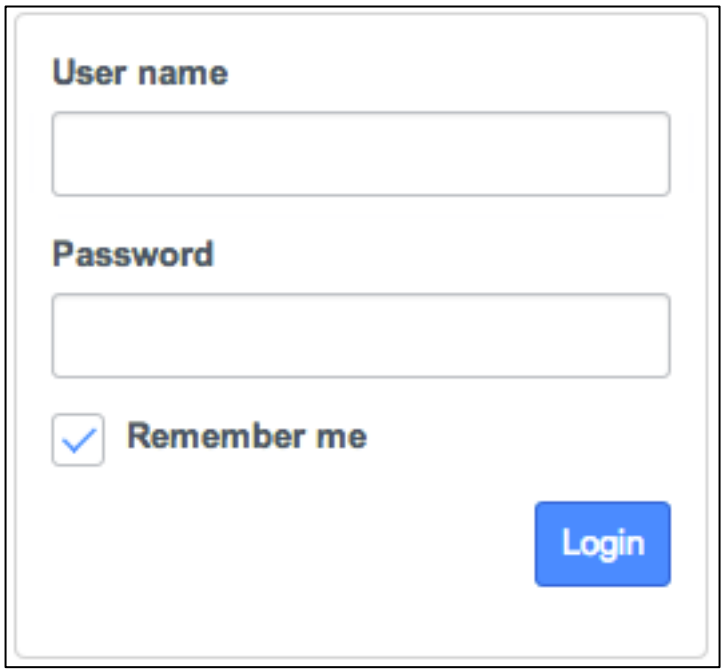
Lab Goal

Configure an admin user that can respond to VM operational tasks and approvals that are automatically created to support the Cloud Provisioning process. For example, if a VM power on request fails, a task is assigned to an Operator.

Lab 1.1
Set up Cloud Admins

Log on to Your Training Instance

1. Navigate to the unique instance URL provided.
2. Log on to your instance with admin/Knowledge15.



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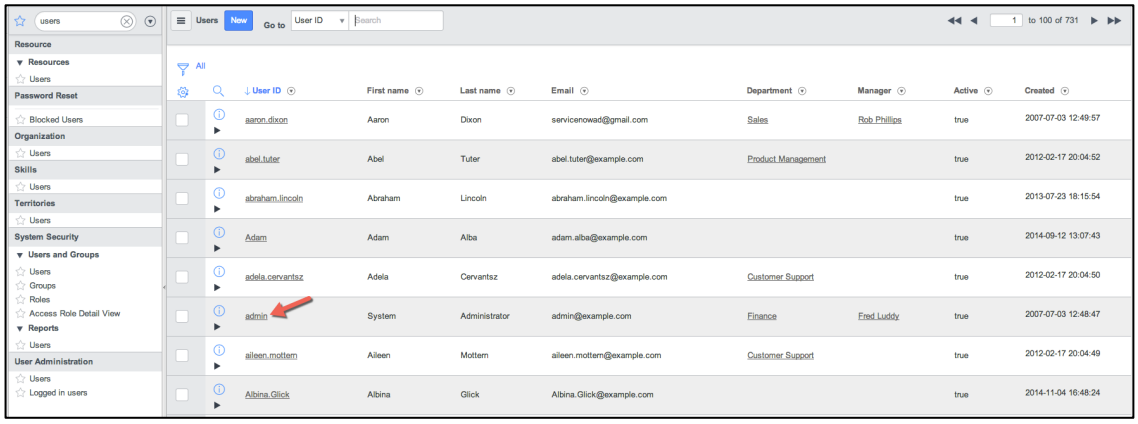
Modify User Groups and Roles

In order to view and respond to the VM operational tasks and approvals automatically created as part of Cloud Provisioning you need to be a member of either the VMware Operators or EC2 Operators group.

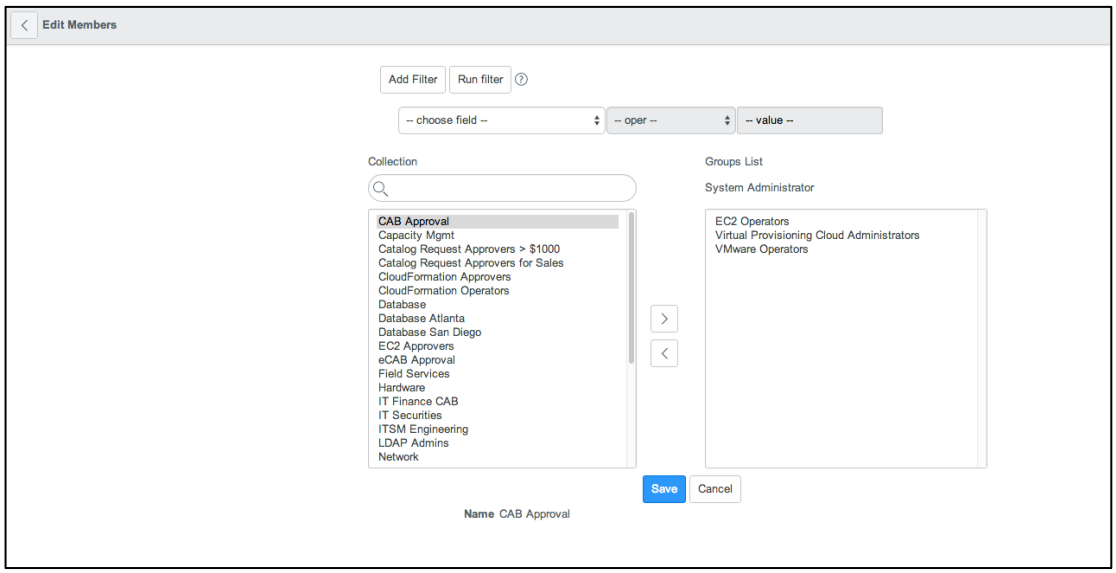
1. Navigate to **User Administration > Users**.

   Note: In subsequent labs, this will be abbreviated to **Application Name > Module Name**.

2. Search for the **admin** User ID and click it to view its details.

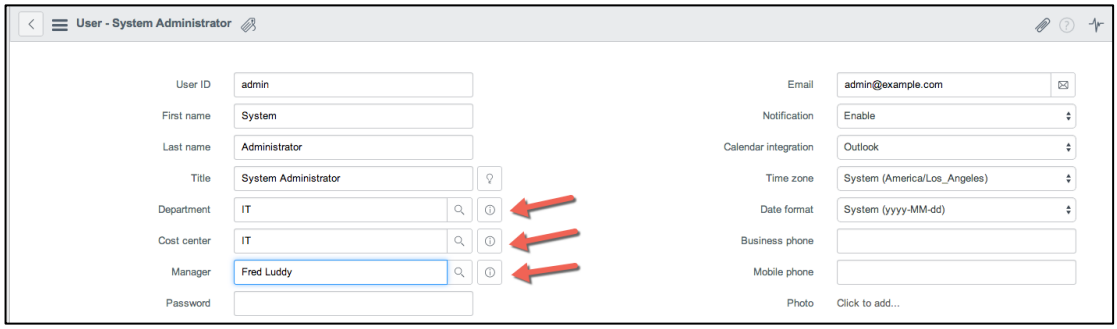


3. Add the admin user to the **Virtual Provisioning Cloud Administrators**, **VMWare Operator**, and **EC2 Operators group**. Click **Save**.



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4. Complete the form as follows:
   - Department: **IT**
   - Cost Center: **IT**
     - This ensures that expense lines and assets generated by Cloud Provisioning are associated with a cost center
   - Manager: **Fred Luddy**
     - He approves the VM change requests when you modify a VM under change control later in the lab.



5. Click **Update**.

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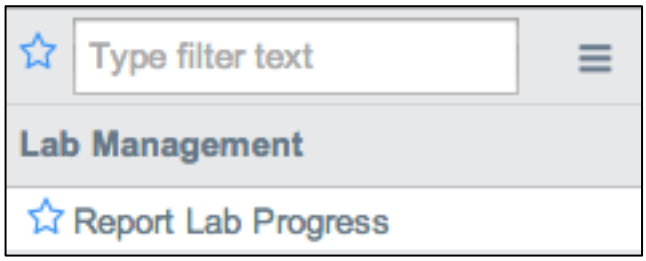
Lab Success Verification

1. **Cloud Provisioning > Cloud Operations Portal.** Verify that you can see Virtual Provisioning tasks at the top of the portal. Only members of the VM/EC2 Operator groups can view these tasks. Your screen should look like the example.

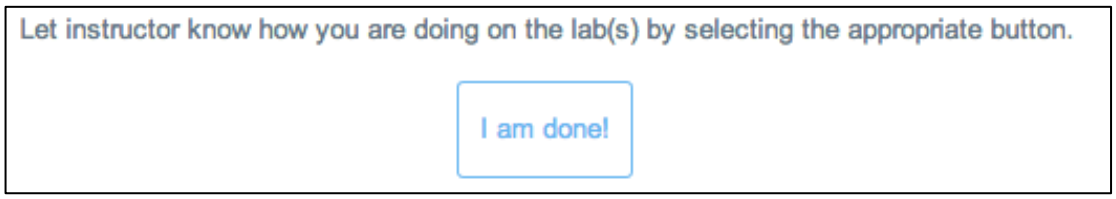


Progress Report

1. **Lab Management> Report Lab Progress**.



2. Click **I am done!**



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Lab Goal

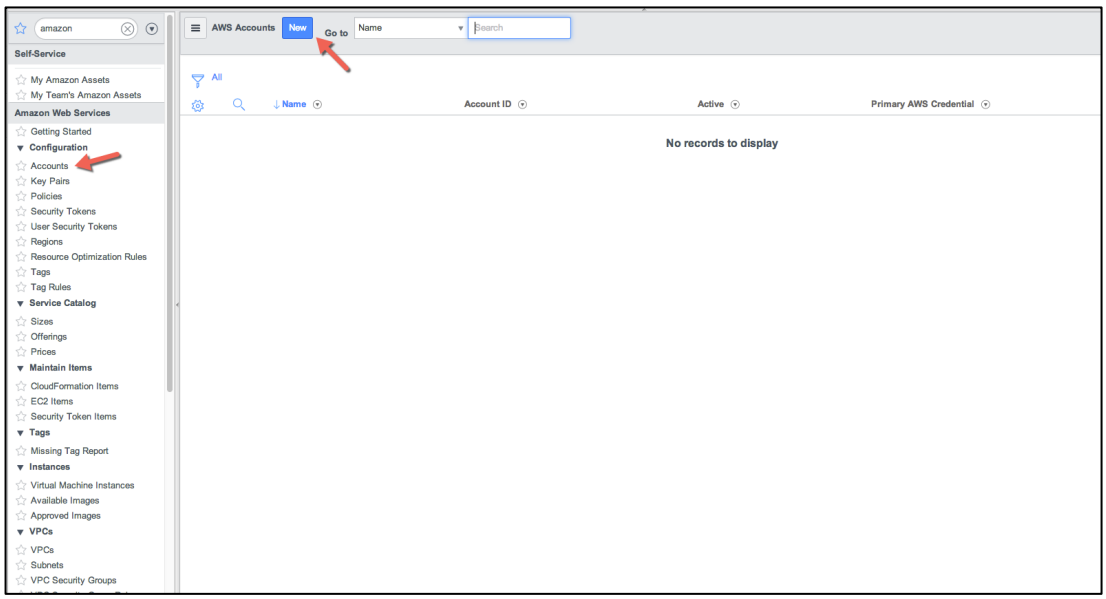
This lab explains how to set up an Amazon account that can be used to provision labs for the remainder of the labs.

Lab 1.2
Set up an Amazon Account

Set up an Amazon Account

Note: For this lab, you use a different account that has already run discovery due to the large number of instances using the same shared account.

1. **Amazon Web Services > Configuration > Accounts**.
2. Click **New**.

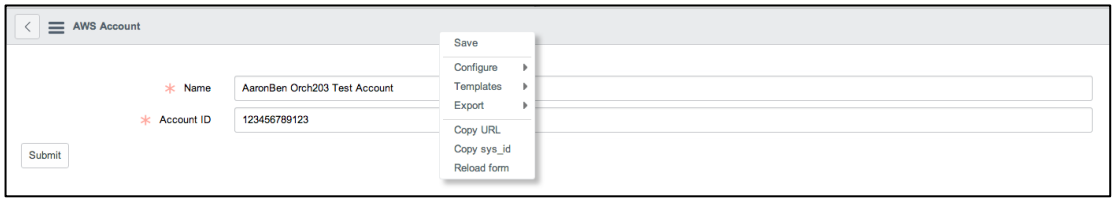


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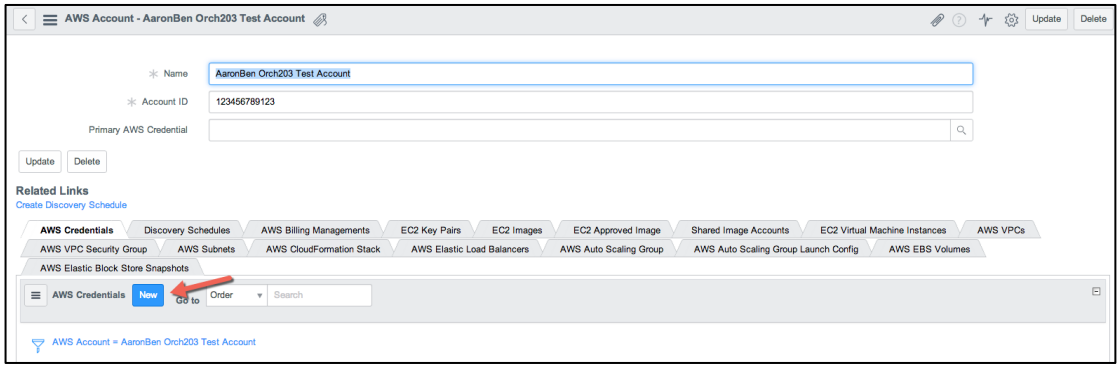
3. Complete the form as follows:

   - Name: **<YourName> Orch203 Test Account**
   - Account ID: **123456789123**

   When complete do NOT submit. Right-click the form header and Save to remain in the account record after saving.



4. When the record is saved, you see a new set of Related lists associated with the account.



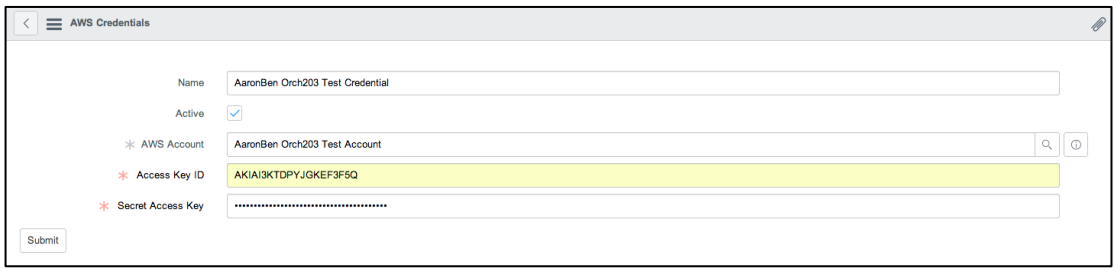
5. Click the **AWS Credentials** related list then click **New**.



Note: You can also do this by clicking on the magnifying glass next to the Primary AWS Credential at the top of the page.

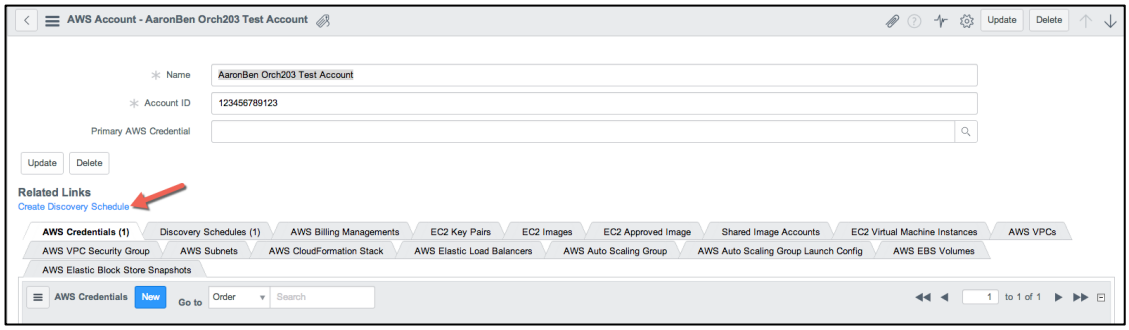
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6. Enter the following information:
   - Name: **<YourName> Orch203 Test Credential**
   - AWS Account: **Auto-populated**, unless you clicked on the magnifying class.
     - If it is not populated, type in the name of the AWS Account that you just created.
   - Access Key ID: **Provided by your instructors**
   - Secret Access Key: **Provided by your instructors**



7. Click **Submit**.

8. Click the related link **Create Discovery Schedule**.



Note: From here you can set up a regular schedule or select Discover now. In this case discovery may not complete in the duration provided in the lab for all of the instances, so we can skip this step.

MID server: **lab_midserver**

9. Take some time to review the information that was discovered by the AWS discovery.

10. **Amazon Web Services > Configuration > Accounts**.

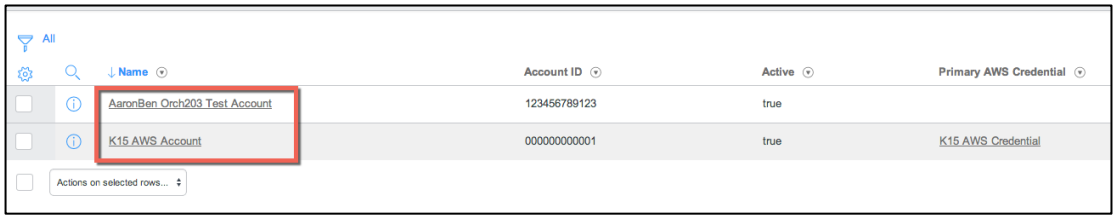
11. Click the preconfigured account (not the one that you created), **K15 AWS Account**.

12. Review the key pairs, images, virtual machine instances, VPCs, VPC Security groups, Subnets and EBS to become familiar with the information that is discovered.

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Lab Success Verification

1. You should see two accounts listed under **Amazon Web Services > Configuration > Accounts**
   Note: One was prepopulated; the other is the one that you created.



Progress Report

1. Navigate to **Lab Management> Report Lab Progress**.

2. Click **I am done!**

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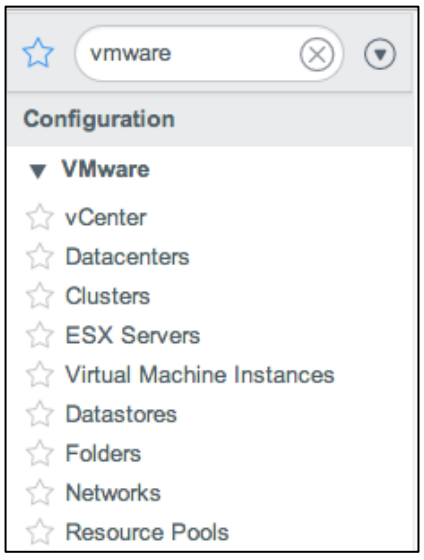
Lab Goal

This lab explains how to interact directly with Cloud Provisioning discovered VMs, from the CMDB. This streamlines automated procedures like power on/off, terminate, extend lease, modify CPU/MEM/HDD, etc.

Lab 2.1 Power on VM

Power On a Virtual Machine

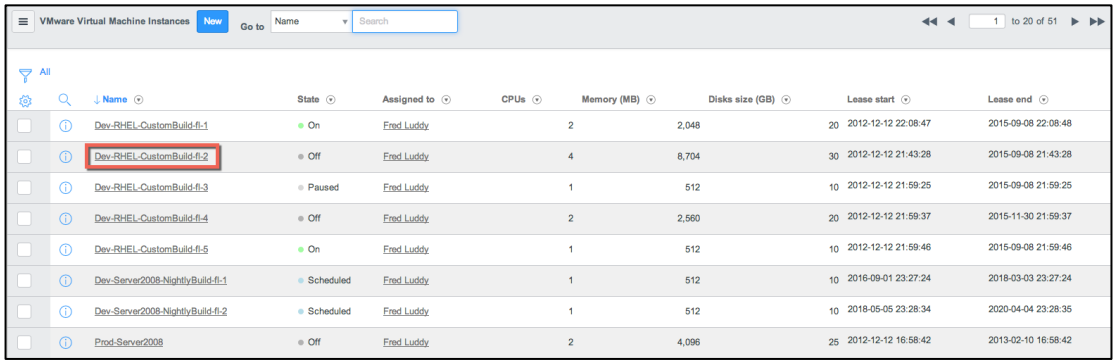
1. Type **VMware** into the type filter text. Explore the data that Orchestration discovered by clicking through each table below. Be sure to drill into items like Datacenters to see the relationships that were created.



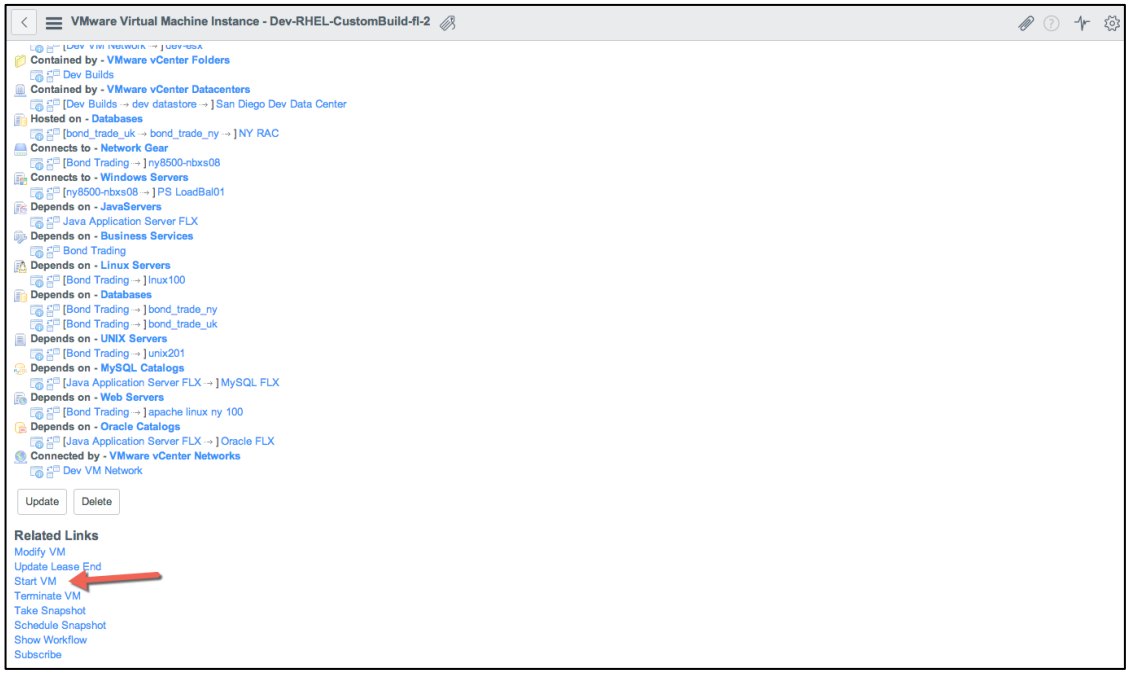
2. **VMware > Virtual Machine Instances**.

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3. Click **Dev-RHEL-CustomBuild-fl-2**.

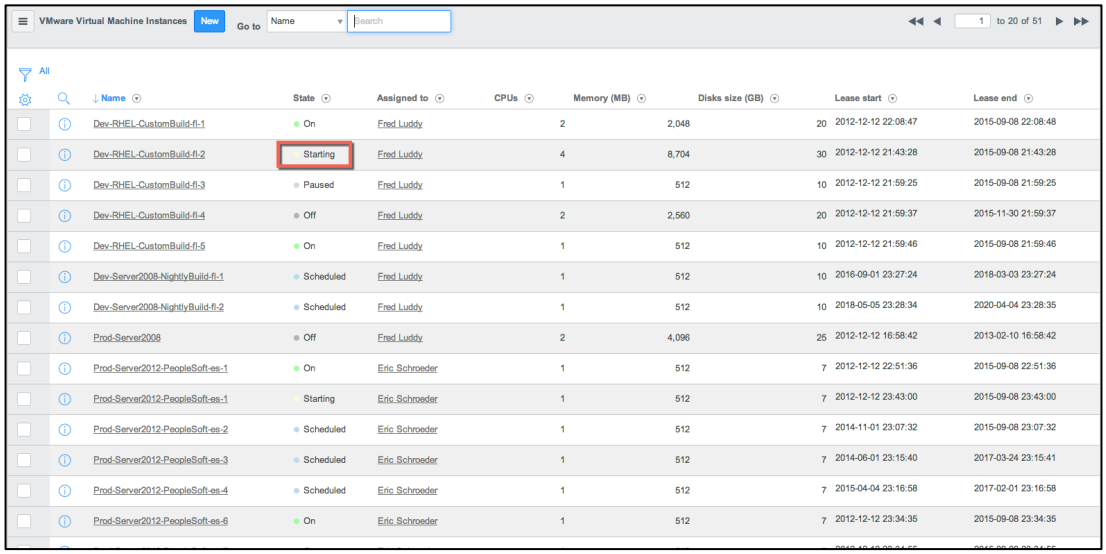


4. Under Related Links, click **Start VM.**



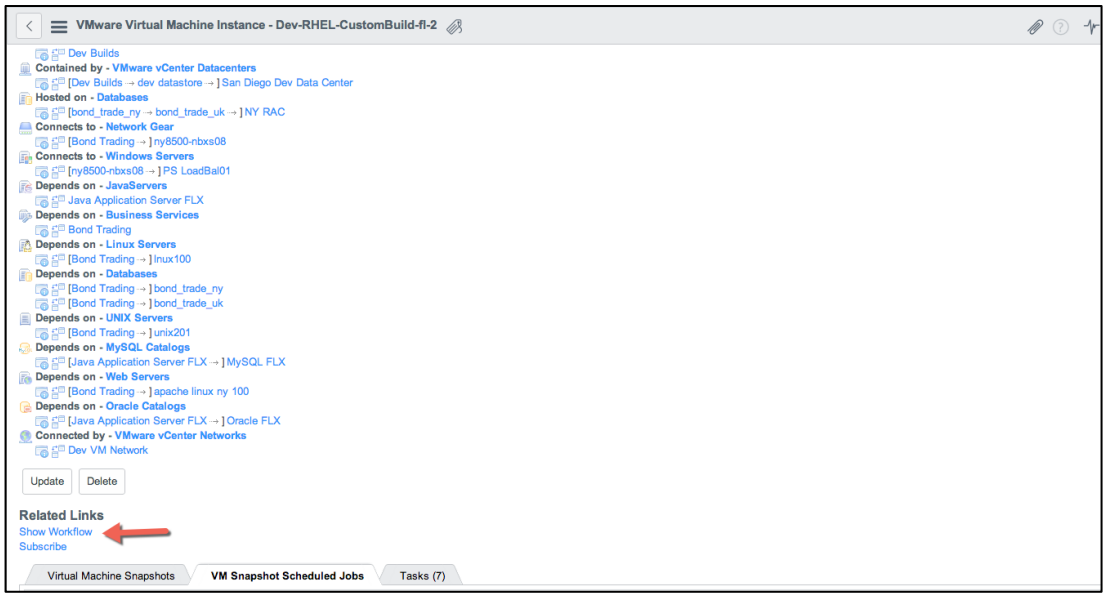
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5. This changes the state of the VM to **Starting**.



6. Click **Dev-RHEL-CustomBuild-fl-2** again.

7. Under Related Links, click **Show Workflow** to view the Orchestration Workflow that is attempting to start the VM.

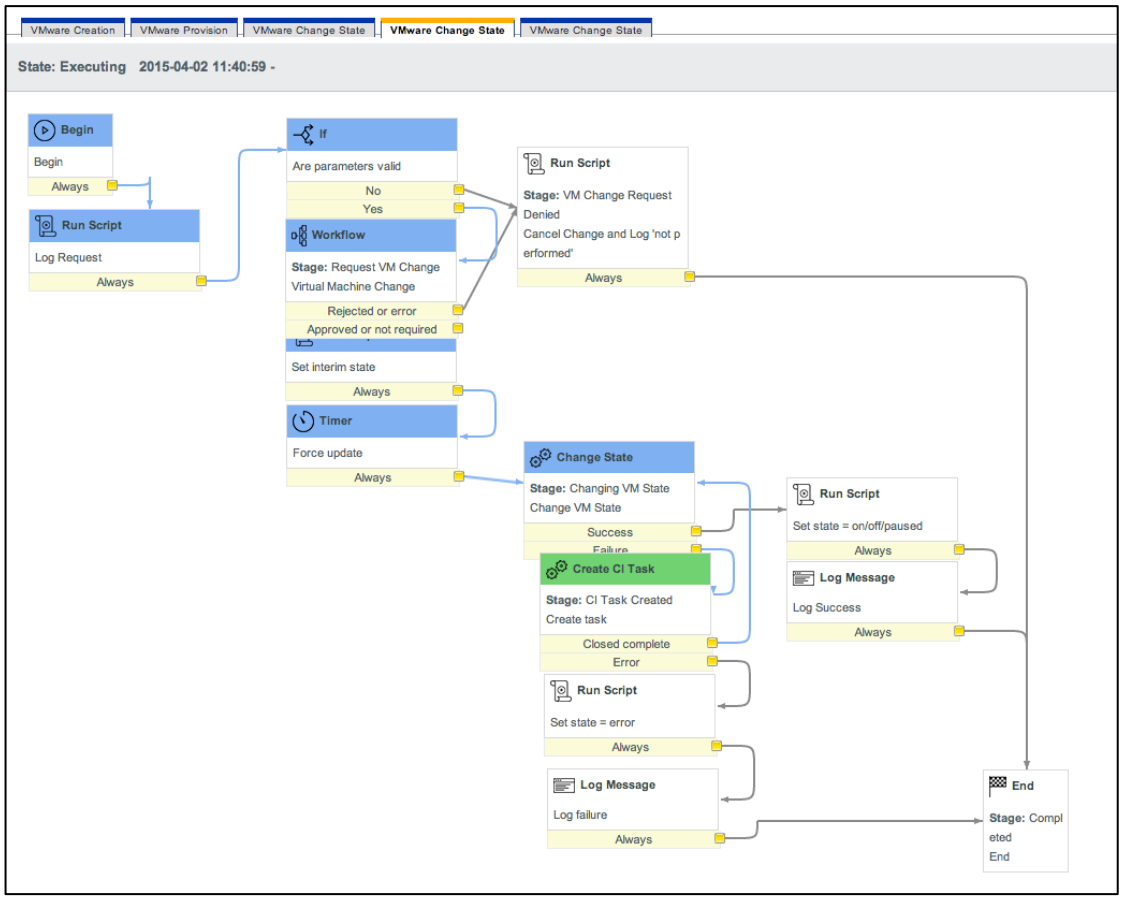


Note: Workflow opens in new window.

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The **VMWare Change State** workflow activity attempts to start the VM but fails. A task is automatically created and assigned to the VMware Operators group. In order to triage this issue, you need to view the task from the Cloud Operations Portal.

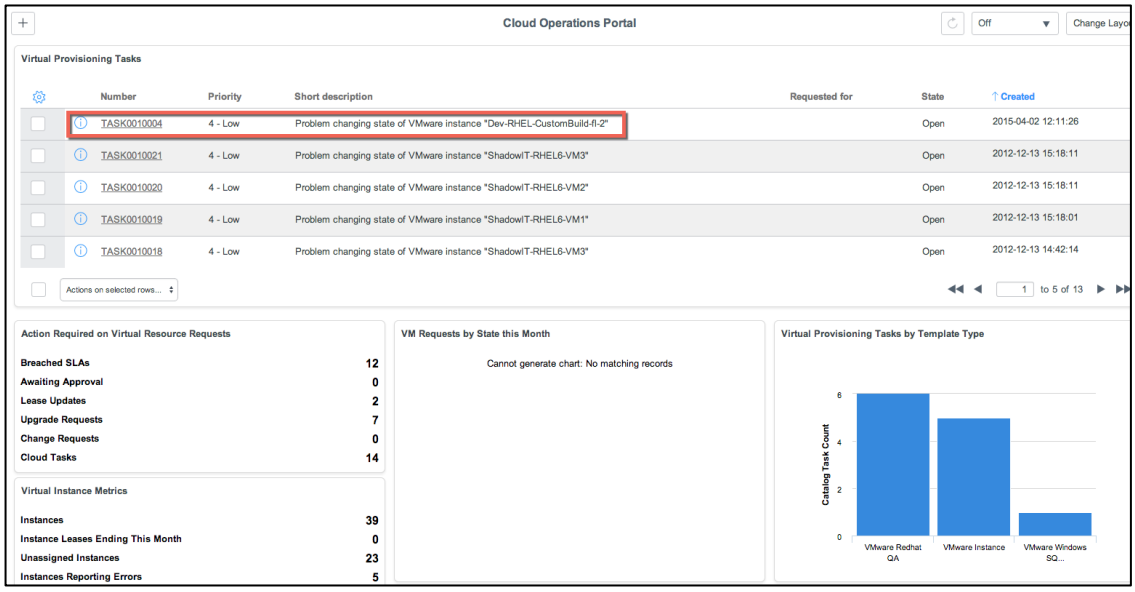
Note: If you do not see the workflow below, click refresh on the top right of the window to update the workflow image. It may take a minute or two to fail.



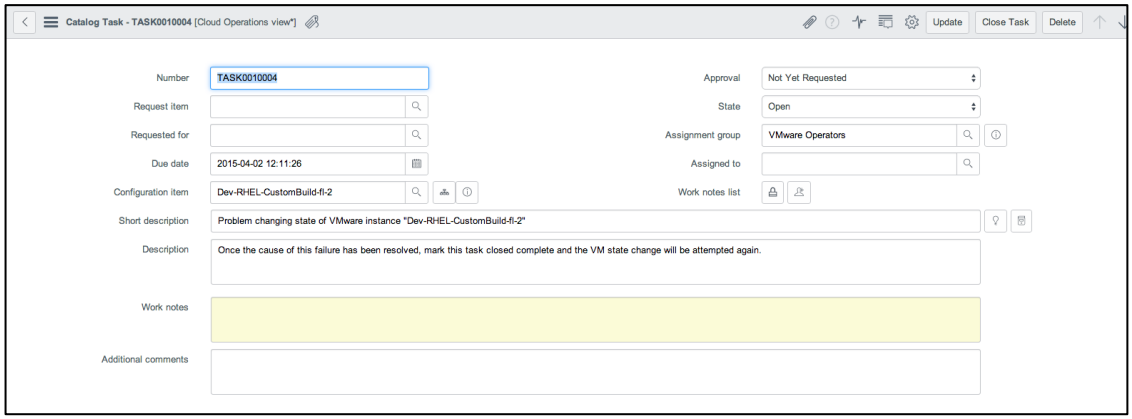
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8. **Cloud Provisioning > Cloud Operations Portal**.

9. Observe that there is a new Virtual Provisioning task that requires your attention with a description of **Problem changing state of VMware instance "Dev-RHEL-CustomBuild-fl-2”**.



10. Click the task **Number** to review it. Note that the affected CI, assignment group, and description are automatically set in the task.



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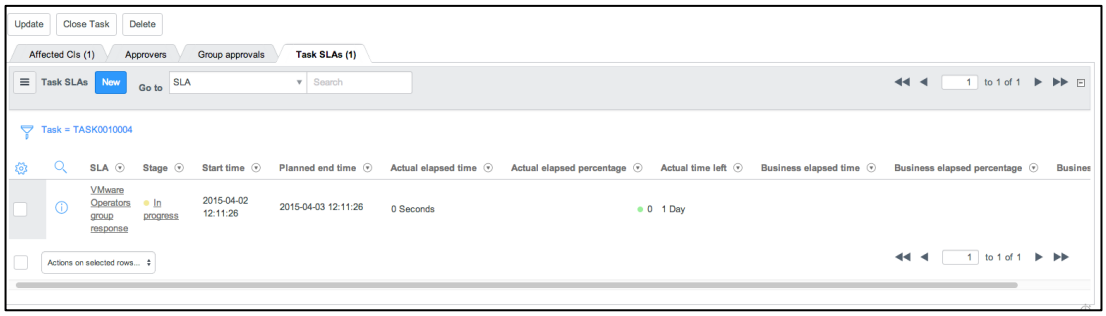
Lab Success Verification

1. Scroll down to the bottom of the task to see the details of the error:

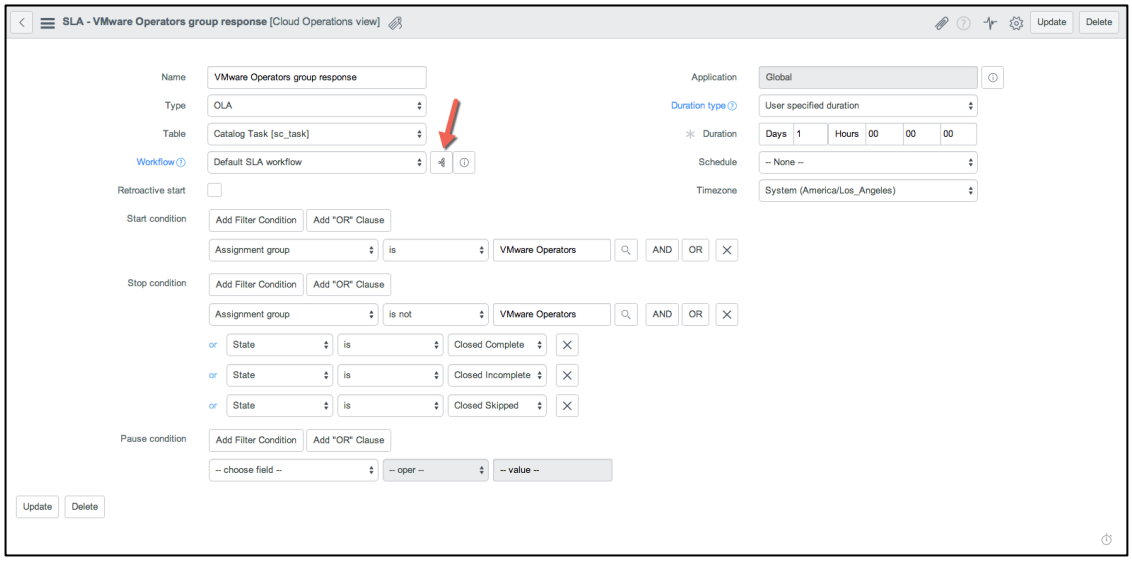
   Unable to establish connection to https://10.15.235.24/sdk:

   This error is direct from the VMware vSphere API when connection to vCenter fails. This is accurate, since the Lab instance is not actually connected to a live vCenter environment.

2. Click the **Task SLAs** related list. This shows the automatic SLA/OLA that is generated to ensure that the VMware Operator team responds to this task within one day by default. You can drill into the SLA record to see what prompts it to fire.



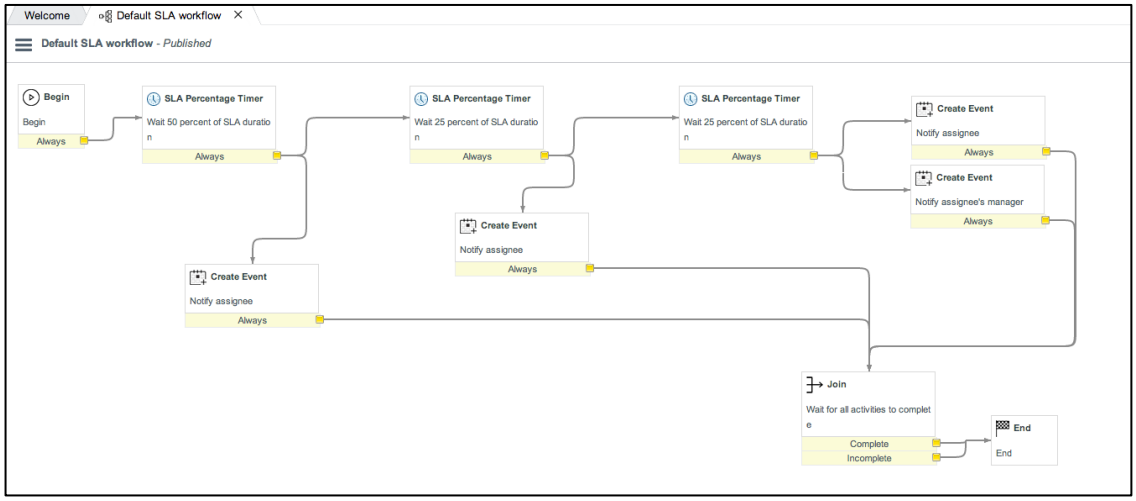
3. Click the **VMWare Operators group response** record.



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4. Click **Show Workflow**.

   Default SLA workflow fired for the VMware Operators group response SLA/OLA:



Progress Report

1. Navigate to **Lab Management> Report Lab Progress**.

2. Click **I am done!**

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Lab Goal

The Service Catalog is the store front for all IT offerings. Decide which VMs can be ordered with Cloud Provisioning by easily creating Catalog Offerings for AWS. Depending on the audience, you can make the offering very simple or allow the end users to select a number of different options when ordering.

Lab 3.1
Create an AWS Service Catalog Offering

Approve Images for Use: AWS

1. **Amazon Web Services > Instances > Available Images**.

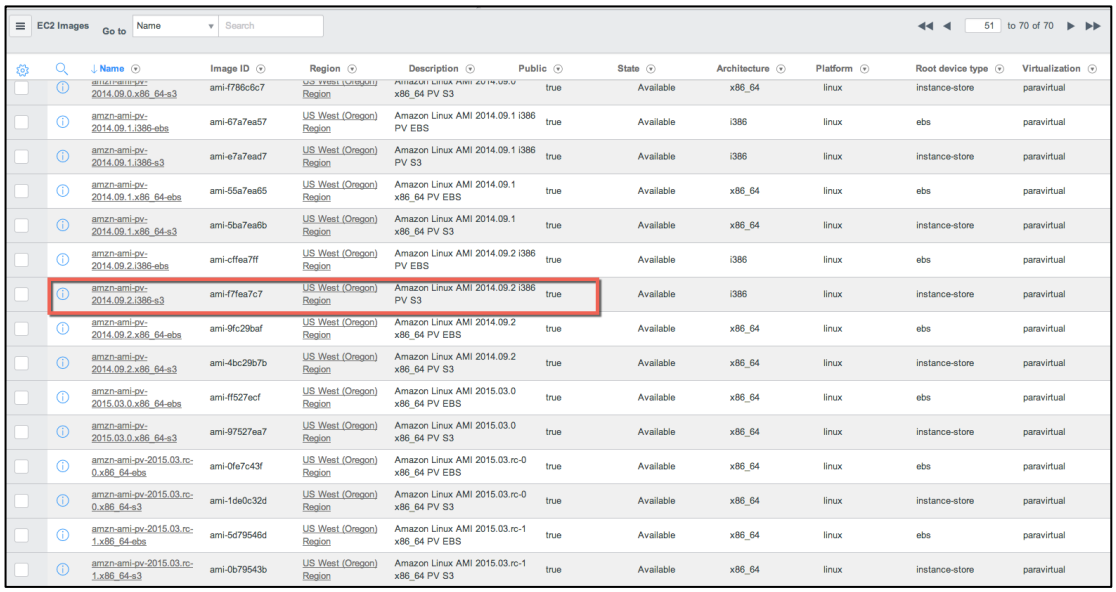


2. Right-click one of the images that has a Region of **US West (Oregon) Region** and select show matching.

   Note: All of the images provisioned in the lab will be done in the West (Oregon) region.

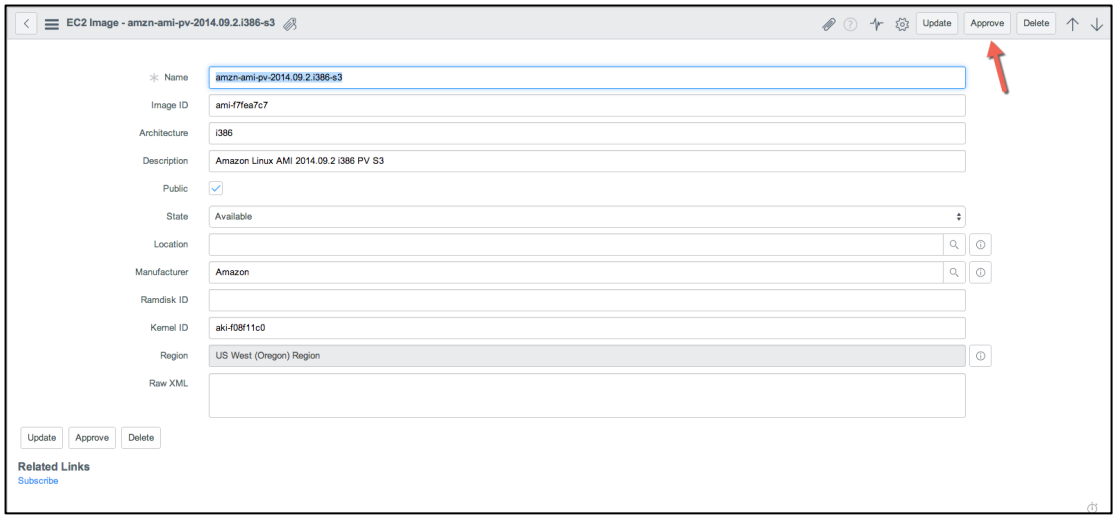
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3. Search for the Name ***amzn-ami-pv** to find all Amazon Linux Images. Click **amzn-ami-pv-2014.09.2.i386-s3**.



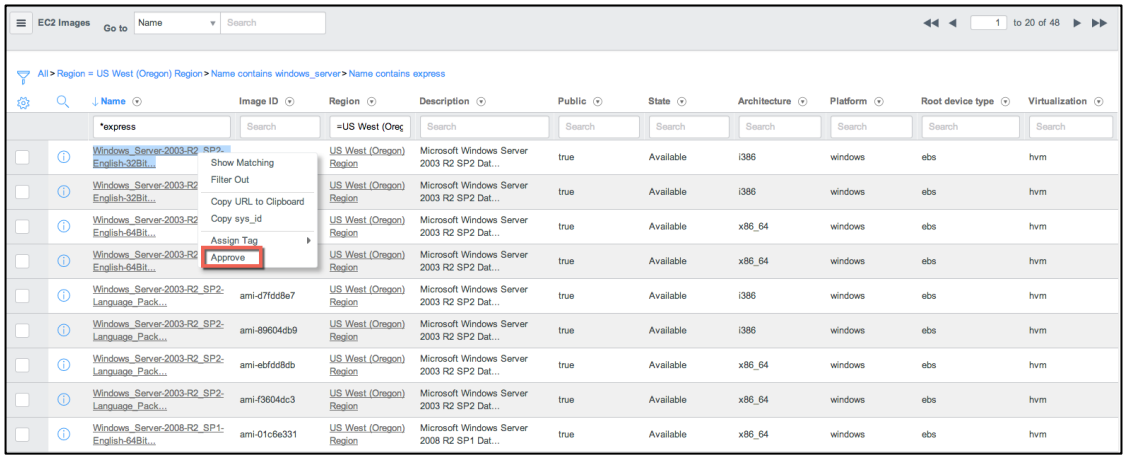
Note: You may need to move to the last page in the list of EC2 images.

4. Click the **Approve** button. This adds the Amazon Linux image to the list of Approved Images. Only approved images can be selected as VM offerings in the Service Catalog.

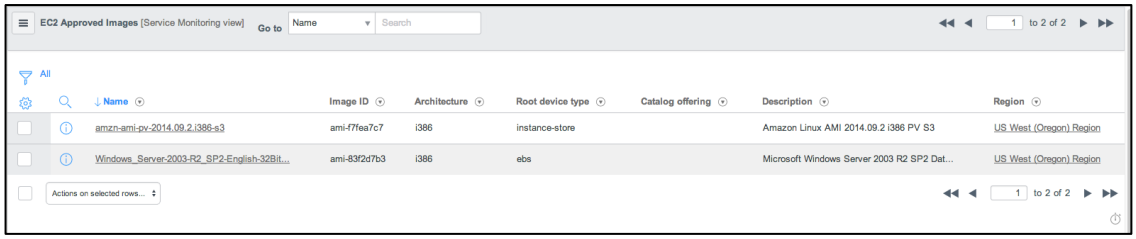


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5. Perform the same approval for a **Windows_Server-2003-R2_SP2-English-32Bit-SQL_2005_SP4_Express-2015.02.11** image (Image ID: **ami-83f2d7b3**). Search for ***express**. You can also right-click the image in the list to approve.



6. Click **Amazon Web Services > Instances > Approved Images**. You should see the following:

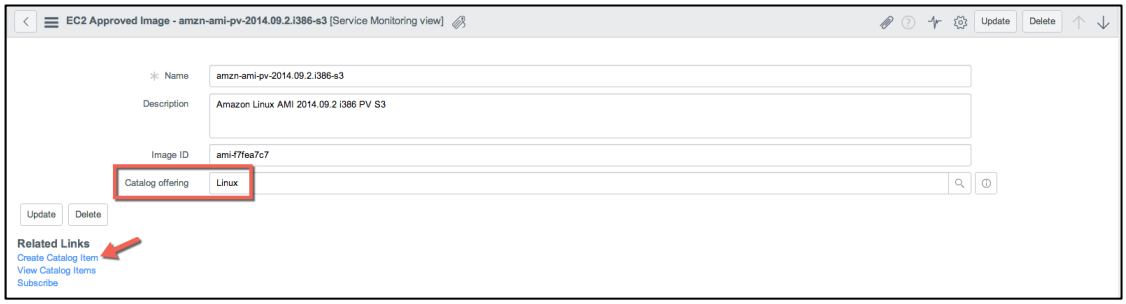


Note: Ensure that the images are the correct name and in the Oregon Region.

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Create a Service Catalog offering for Auto Provisioning: EC2

1. Navigate to **Amazon Web Services > Approved Images**.
2. Click **amzn-ami-pv-2013.09.1.i386-s3**.



3. Set Catalog offering to **Linux**.
4. Right-click the form header and **Save** the record.

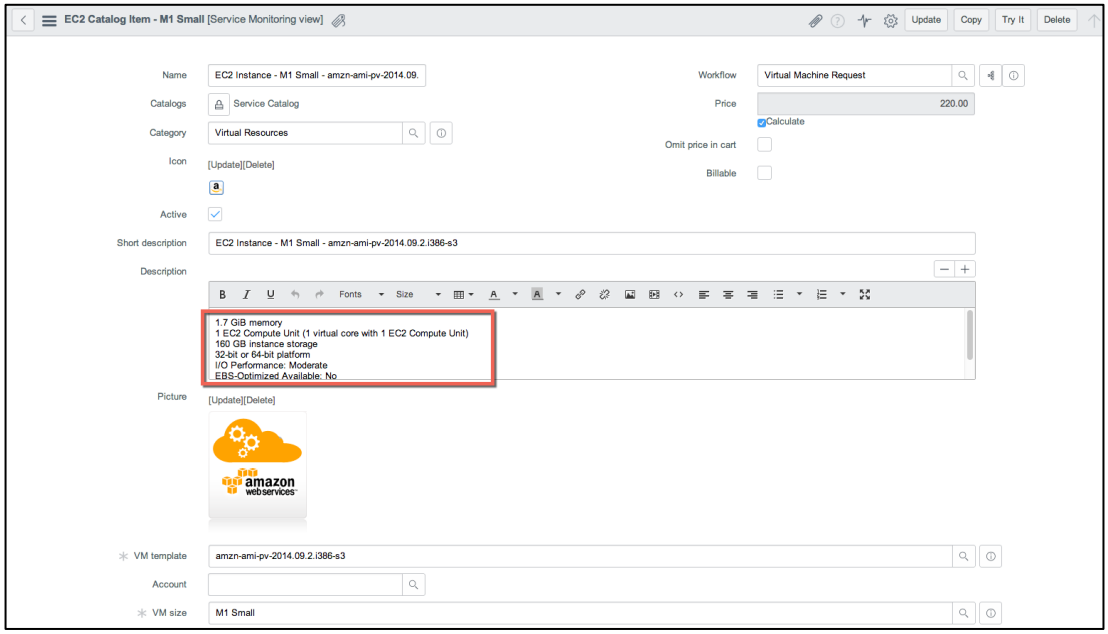
   Setting the Catalog offering facilitates general EC2 orders where cloud users simply select the operating system they want and an EC2 Operator receives a task to select which EC2 image to use. This exercise assumes that the end users know exactly what they want, so you create a catalog offering allowing them to automatically order the VM without creating any manual tasks.

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5. Click the **Create Catalog Item** related link.

   An EC2 Catalog Item is automatically created and placed in the Service Catalog in the Virtual Resources category. In this screen you can modify what is presented to the end user when they order this Amazon Linux EC2 instance.

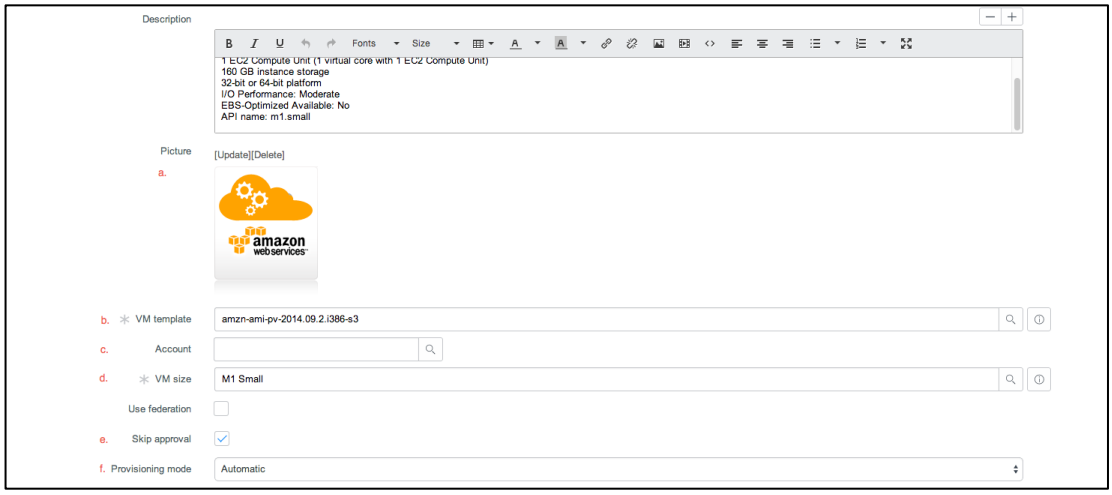
   Note that the description auto-populates from the image as well as adding the default variable sets.



   The price is calculated by multiplying the EC2 Size price factor and the Catalog EC2 Element Price. These are options that can be modified based on your cost structure. In this example, the M1 Small size has a price factor of 1 and the default element price is $220, resulting in one time calculated price of $220. You can view these settings in the Amazon Web Services module within Prices and Sizes.

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6. Scroll to the bottom of the Catalog Item to view additional details.



- **Picture**: You can personalize the picture to provide a unique ordering experience.
- **VM template**: is automatically selected based on the approved image.
- **Account**: Ensure that you **select the K15 AWS Credential**, not the one created earlier in the lab. Select **K15 for the key pair**.
- **VM Size**: By default, the smallest VM size is chosen (in this case, M1 Small). PLEASE keep it at Small/Micro; do not provision anything larger since Amazon charges us for it. Available sizes are determined based on the architecture of the EC2 Image. Not all sizes are available for all instances. Note that if you change the size, the price is automatically updated in the catalog item.
- **Skip approval**: checked by default. If unchecked, someone in the EC2 Approvers group has to approve request. Leave this checked to expedite the order process.
- **Provisioning mode**: determines if a task is assigned to the EC2 Operators group to verify the order details before provisioning. Automatic is the default, bypassing the manual task. Leave this setting at Automatic.

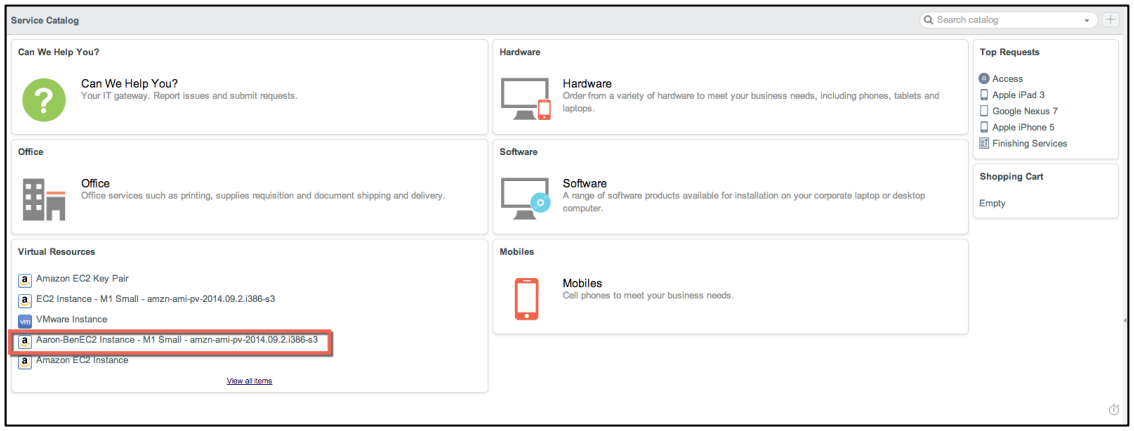
7. Click **Update**.

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Lab Success Verification

1. **Self-Service > Service Catalog**.

2. Verify that the new Service Catalog offering was created in Virtual Resources. By default the name is **EC2 Instance - M1 Small - amzn-ami-pv-2013.09.1.i386-s3.**



3. (Optional) Repeat all steps to create an offering for the approved Windows 2003 server.

Progress Report

1. Navigate to **Lab Management> Report Lab Progress**.

2. Click **I am done!**

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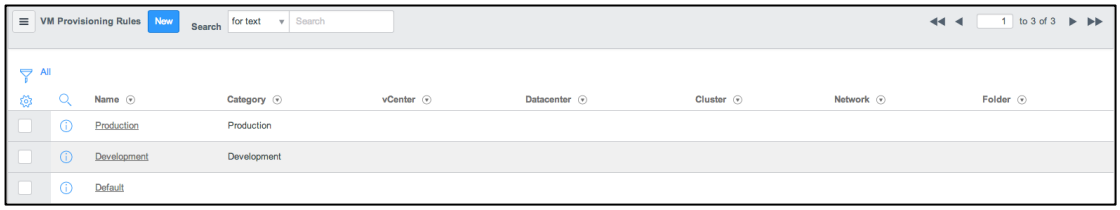
Lab Goal

One of the greatest advantages of Cloud Provisioning is how easy it is to create catalog offerings. This lab explains how to create offerings to automatically deploy VMware VMs.

Lab 3.2
Set up VMware Catalog Offering

Create a Service Catalog offering for Auto Provisioning: VMware

1. **VMware > Rules > Provisioning Rules**.



Provisioning rules allow you to predetermine where a VM is deployed within your environment. Here, you will create rules to determine how VMs are deployed when a user selects to use a VM for development.

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2. Click the **Development** provisioning rule and set the following criteria:

   Note: Each selection guides you to the next one. This ensures that only valid provisioning rules are created based on VMware specifications in the CMDB.

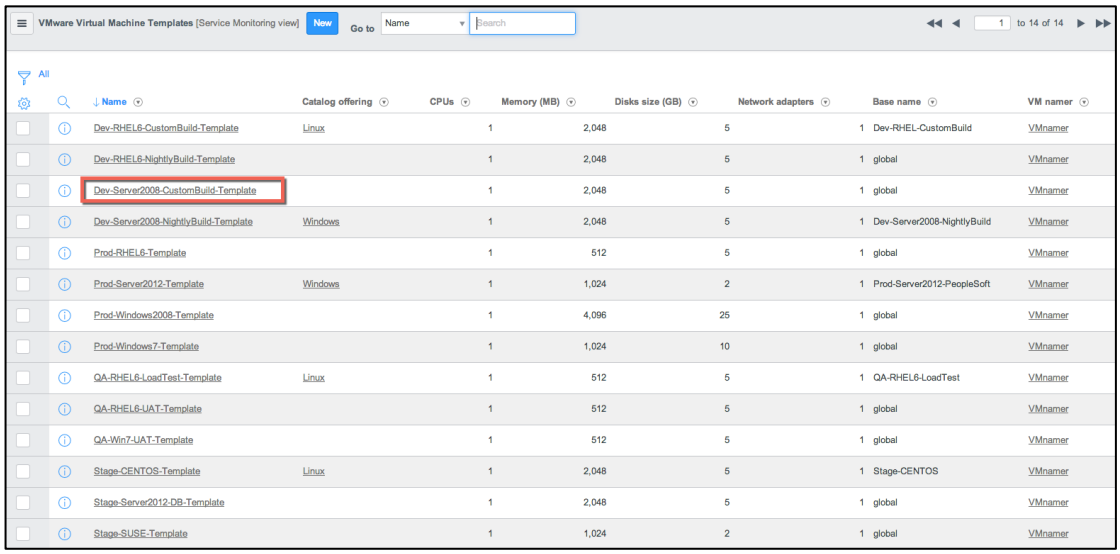
   - Name: **Development**
   - Category: **Development**
     - (this list references the Used For field within the business service table. This is what the end user sees in the service catalog)
   - vCenter: **ServiceNow vCenter**
   - Datacenter: **San Diego Dev Datacenter**
   - Cluster: **Dev Cluster**
   - Network: **Dev VM Network**
   - Folder: **DevTest**



3. Click **Update**.

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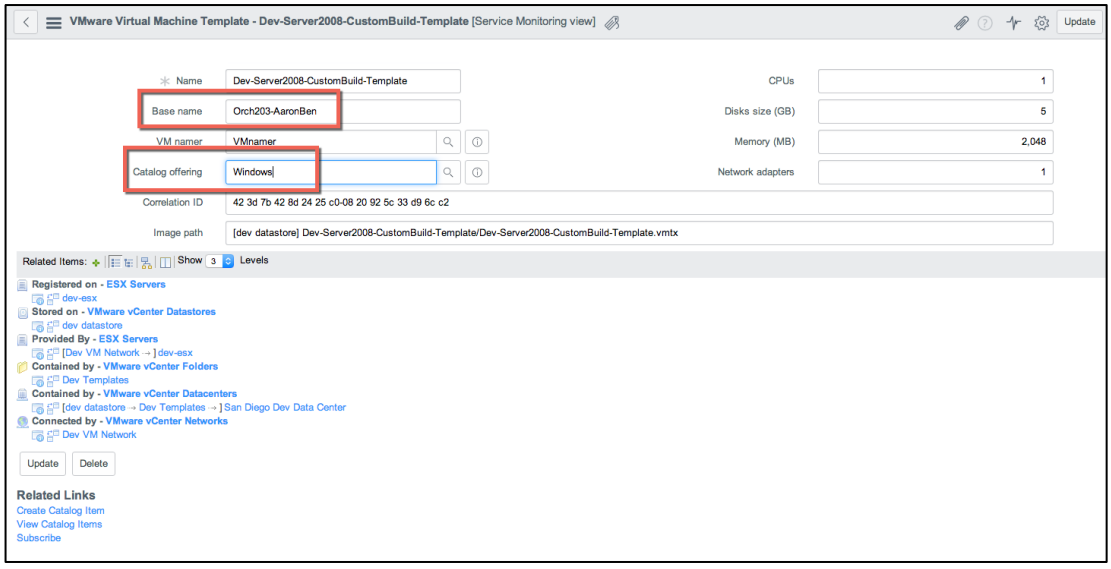
4. **VMware > Configuration > Templates**. Click **Dev-Server2008-CustomBuild-Template**.



Name	Catalog offering	CPUs	Memory (MB)	Disks size (GB)	Network adapters	Base name	VM namer
Dev-RHEL6-CustomBuild-Template	Linux	1	2,048	5	1	Dev-RHEL-CustomBuild	VMnamer
Dev-RHEL6-NightlyBuild-Template		1	2,048	5	1	global	VMnamer
Dev-Server2008-CustomBuild-Template		1	2,048	5	1	global	VMnamer
Dev-Server2008-NightlyBuild-Template	Windows	1	2,048	5	1	Dev-Server2008-NightlyBuild	VMnamer
Prod-RHEL6-Template		1	512	5	1	global	VMnamer
Prod-Server2012-Template	Windows	1	1,024	2	1	Prod-Server2012-PeopleSoft	VMnamer
Prod-Windows2008-Template		1	4,096	25	1	global	VMnamer
Prod-Windows7-Template		1	1,024	10	1	global	VMnamer
QA-RHEL6-LoadTest-Template	Linux	1	512	5	1	QA-RHEL6-LoadTest	VMnamer
QA-RHEL6-UAT-Template		1	512	5	1	global	VMnamer
QA-Win7-UAT-Template		1	512	5	1	global	VMnamer
Stage-CENTOS-Template	Linux	1	2,048	5	1	Stage-CENTOS	VMnamer
Stage-Server2012-DB-Template		1	2,048	5	1	global	VMnamer
Stage-SUSE-Template		1	1,024	2	1	global	VMnamer

5. Set the following criteria:
   - Base name: **Orch203**-<yourname>
   - Catalog Offering**: Windows**

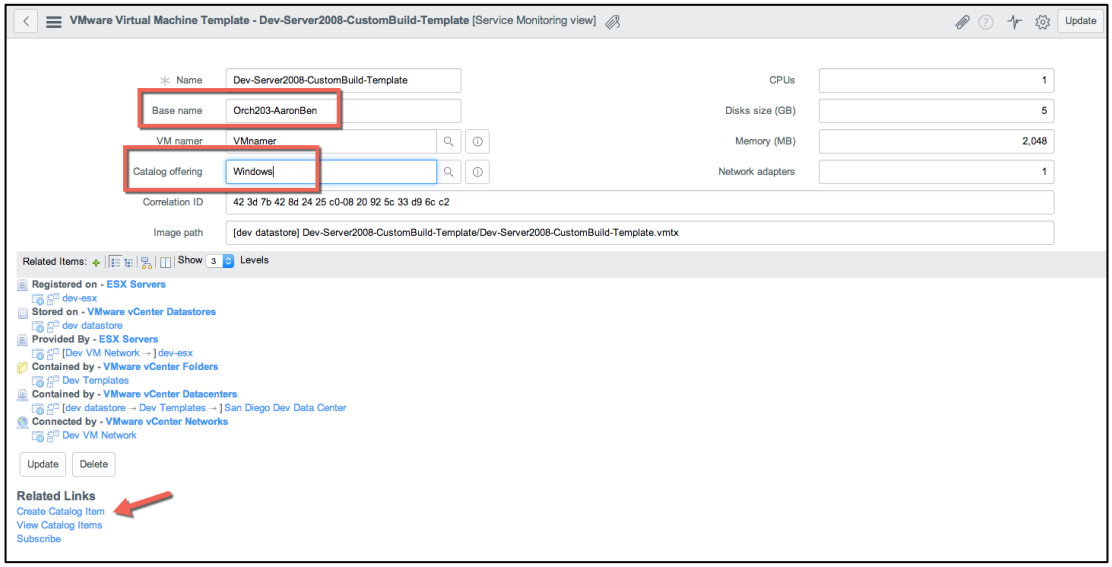
   NOTE: This is the prefix of the unique name that is generated by the VMnamer script. If the Base name is Orch203, then the resulting name of the first VM order will be **Orch203-sa-1. [basename]-[user initials]-[unique ordered number].**



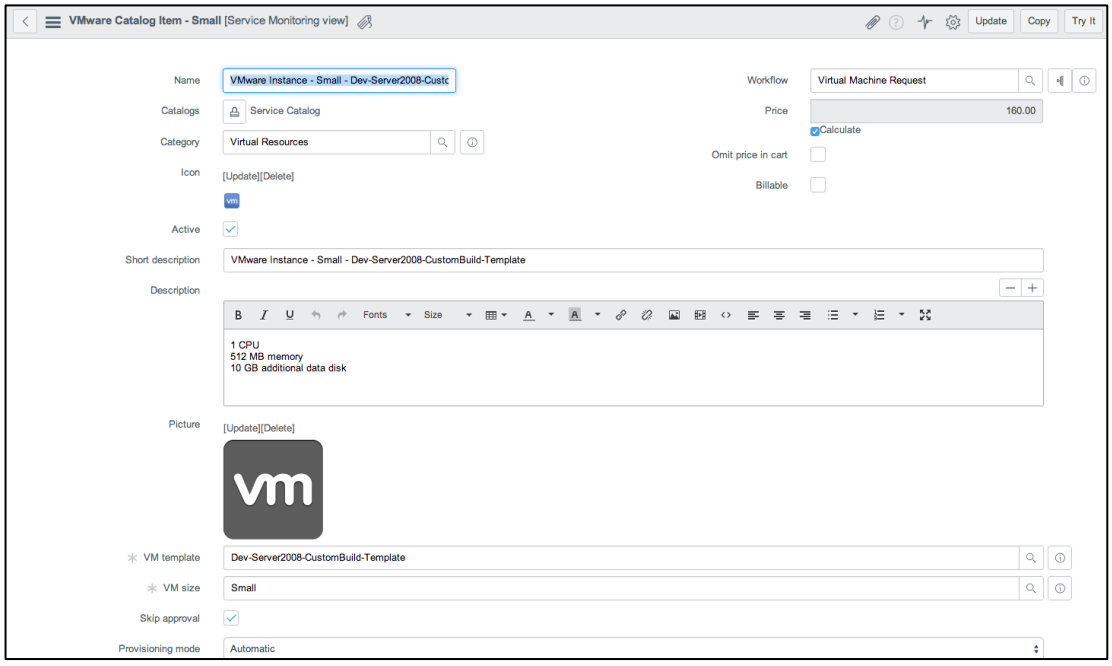
6. Right-click the form header and **Save.**

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7. Click the **Create Catalog Item** Related Link.



8. Review the catalog item that was created.



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9. Price is once again calculated based on criteria you set up in Cloud Provisioning. To review the pricing elements, navigate to **VMware > Service Catalog >Prices**. Here you find the Catalog VM Element Prices. The $160 calculated price was determined based on multiplying the element price for cpu/memory/disk by how the VM is ordered, which in this case is with 1CPU/512MB Memory/10GB disk.

   This allows you to easily update the prices for all VMware catalog offerings in one place. If your organization decides that CPU prices should increase for new VM orders, then you modify the CPU element price. The change is reflected in all new orders.



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10. Scroll to the bottom of the catalog item to review the default settings:



- VM template**: automatically selected** based on the one you chose.
- VM size: default size is **Small**
  - You can easily define your own size criteria as well.
- Skip approval: **checked by default**
  - keep this setting to streamline the ordering process.
- Provisioning mode: **Automatic**.
  - This eliminates any manual tasks that would normally be assigned to the VMware Operators group by using pre-defined provisioning rules to direct VM deployment.
- Disk provisioning type: **Thin**
- Apply guest customization: **checked**
- Customization specification: Select **San Diego Dev Data Center**
  - This option allows you to predetermine how the operating system of the VM is set up. Use this to set criteria like registered user, product key, domain, etc.

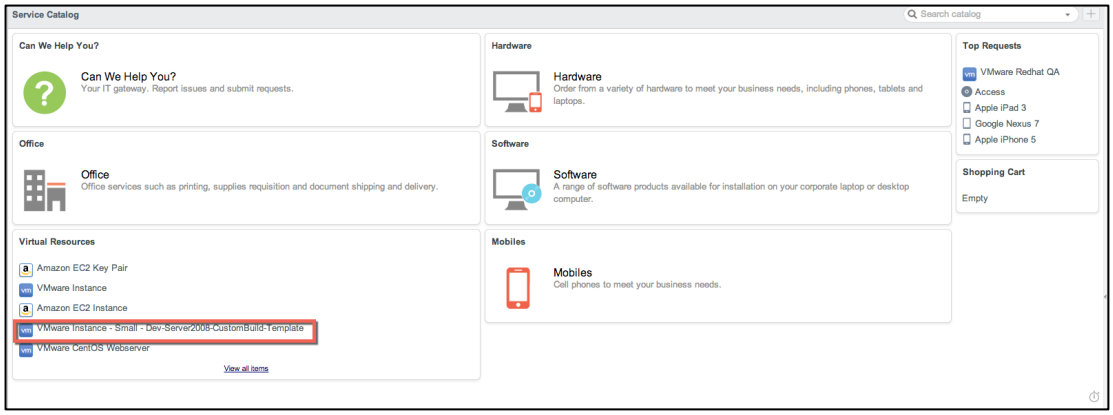
11. Click **Update**.

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Lab Success Verification

1. **Self-Service > Service Catalog**.

2. Verify that the new Service Catalog offering was created in Virtual Resources. By default the name is **VMware Instance - Small - Dev-Server2008-CustomBuild-Template**.



Progress Report

1. Navigate to **Lab Management> Report Lab Progress**.

2. Click **I am done!**

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Lab Goal

This lab explains how to use the Service Catalog to order and deploy EC2 instances. For VMware you review the ordering process.

Lab 4.1
Order a Virtual Machine

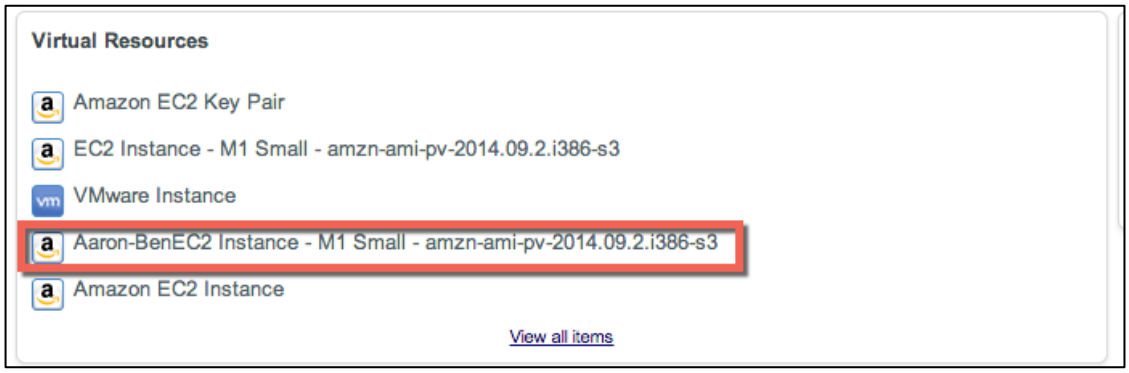
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Order Virtual Resources from the Service Catalog

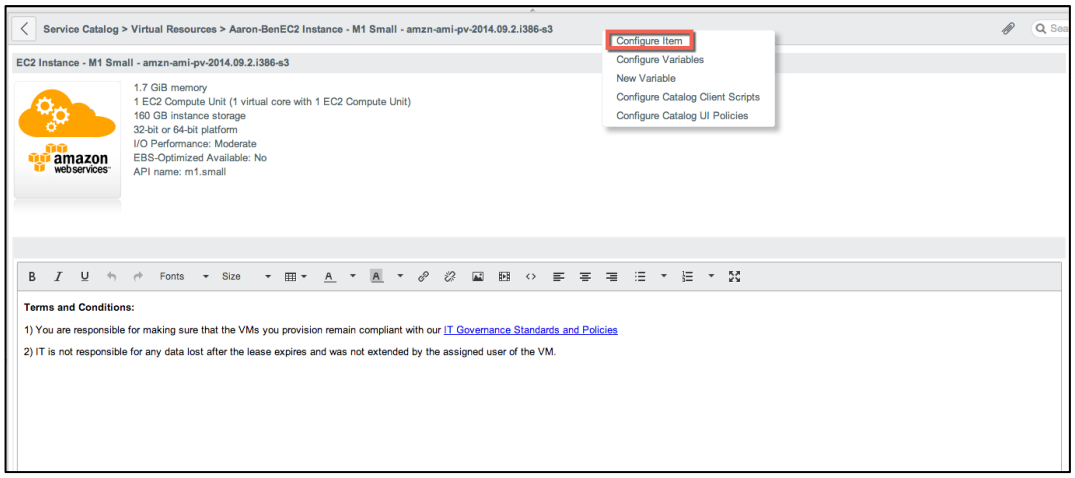
Now that offerings are available in the Service Catalog, you can order virtual machines. The lab environment allows you to fully deploy EC2 instances. For VMware you will review the ordering process.

1. **Self-Service > Service Catalog**.

2. Click the EC2 offering <yourName>**EC2 Instance - M1 Small – amzn-ami-pv-2014.09.2.i386-s3** created previously in the lab.

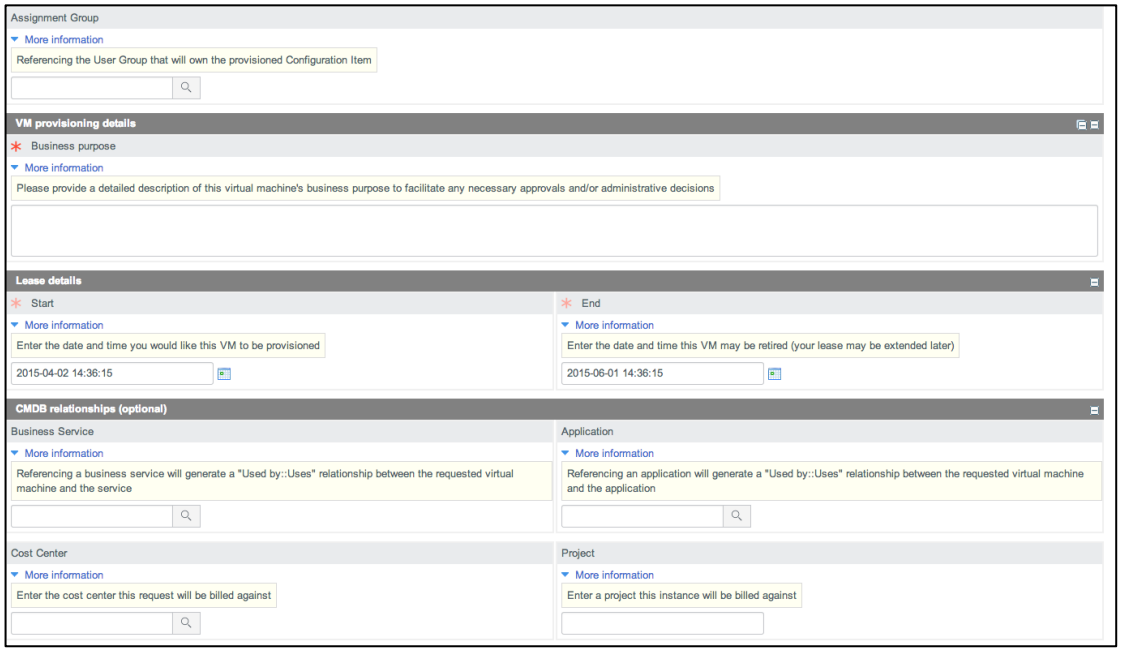


Note: The catalog item is completely configurable. You can configure the item by right-clicking the item header and selecting **Configure Item**. This gives you the flexibility to change the experience that end users have when ordering the VM by modifying images, descriptions, price, etc. In this case, leave the item as is. All of the variables are stored in variable sets that can be reused across multiple VMs.



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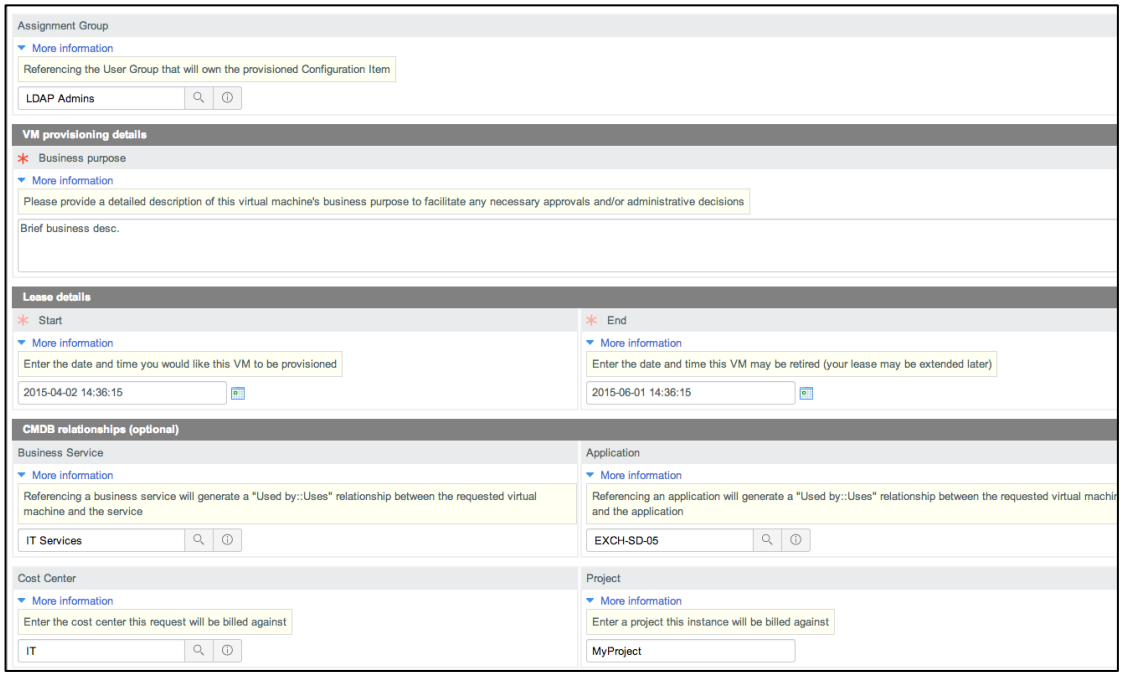
3. Scroll down to the bottom of the catalog item to review the standard provisioning details.



- Assignment Group: **LDAP Admins**.
  - References the User Group that will own the provisioned configuration item.
- Business Purpose: **Brief business description.**
  - Outside of the lab, you would provide a detailed description of the VM's business purpose to facilitate approvals and/or admin decisions. This is mandatory by default.
- Lease Start: Set **5 minutes from the current time**.
  - Lease details are set to ensure the VM starts provisioning at the lease start date. A schedule is created to retire the VM at the lease end date. Users can request for their lease to be extended. Default lease time frames are configurable in Properties within the Cloud Provisioning module.
- Business Service: **IT Services**
- Application: **EXCH-SD-05**
  - CMDB Relationships automatically relate the VM to a business services/application.
- Cost Center: **IT**
- Project: **MyProject**

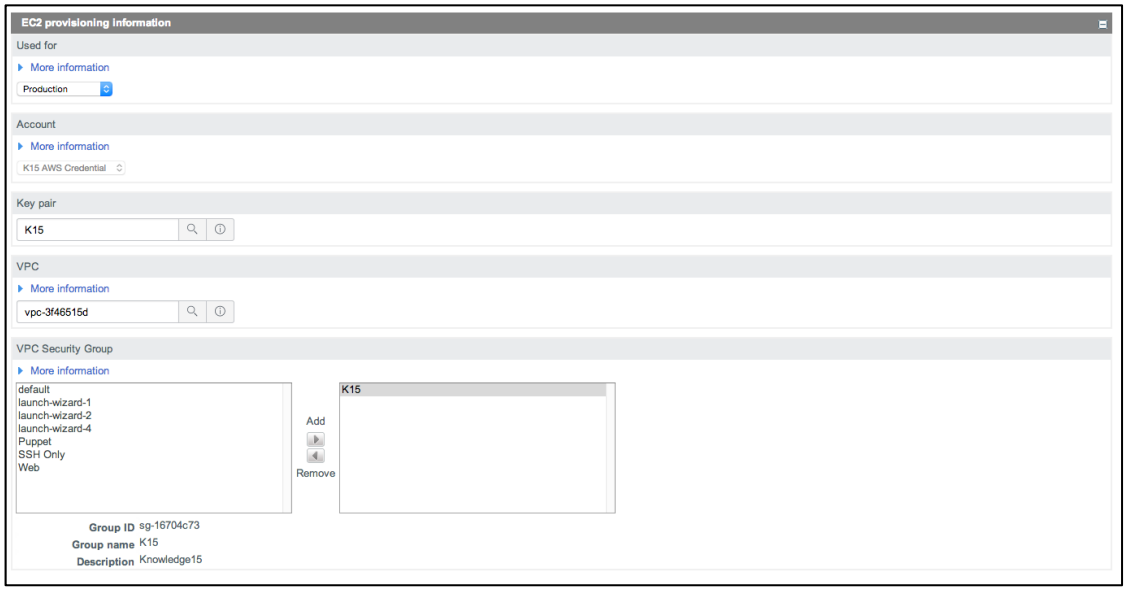
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4. Your screen should look like the example.



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5. Scroll down to the EC2 specific provisioning section.



- Used for: **Production**
- Account: **defaults to the account that was pre-staged**.
- Key pair: **K15**.
- VPC: **vpc-3f46515d**. This populates options for the VPC Security Group.
- VPC Security Group: **K15**.

6. Scroll up and click **Order Now** to submit the VM request.

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7. Navigate to the **My Virtual Assets** page. This page shows you all of the VM orders you have made and the states of those orders. If you set the VM to start after 5 min, you should see a VM in the blue **Scheduled** state. When the scheduler fires, the VM provisioning process begins.



The provisioning process should only take a few minutes, after that the state turns green to indicate that the VM is on.

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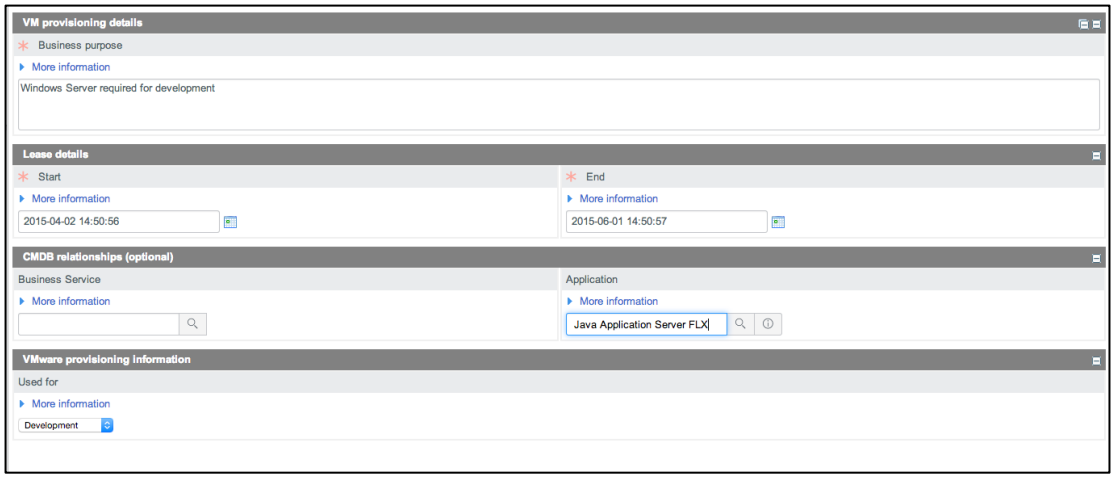
8. **Self-Service > Service Catalog**.

9. Click the **VMware Instance - Small - Dev-Server2008-CustomBuild-Template** offering.



The VM order screen looks virtually identical to the AWS ordering screen. This ensures that your users have a seamless ordering experience, regardless of the virtualization technology.

10. Complete the form as follows:
    - Business purpose: **Windows Server required for development**
    - Lease details Start/End: **Leave defaults**
    - Application: **Java Application Server FLX**
    - Used for: **Development** (This is required to invoke the Provisioning Rule created earlier.)



11. Scroll up and click **Order Now.**

12. Navigate back to the **My Virtual Assets** portal. From here you can refresh the My Virtual Assets gauge at the top right. Notice that the new VM is stuck at the **Starting** yellow state. This is because the lab is not directly connected to a live vCenter environment.

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Lab Success Verification

1. Navigate to **Self-Service > My Virtual Assets**.

2. Click the requested VMware instance item at the bottom of the portal. Verify that the EC2 VM has started.



Progress Report

1. Navigate to **Lab Management> Report Lab Progress**.

2. Click **I am done!**

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Lab Goal

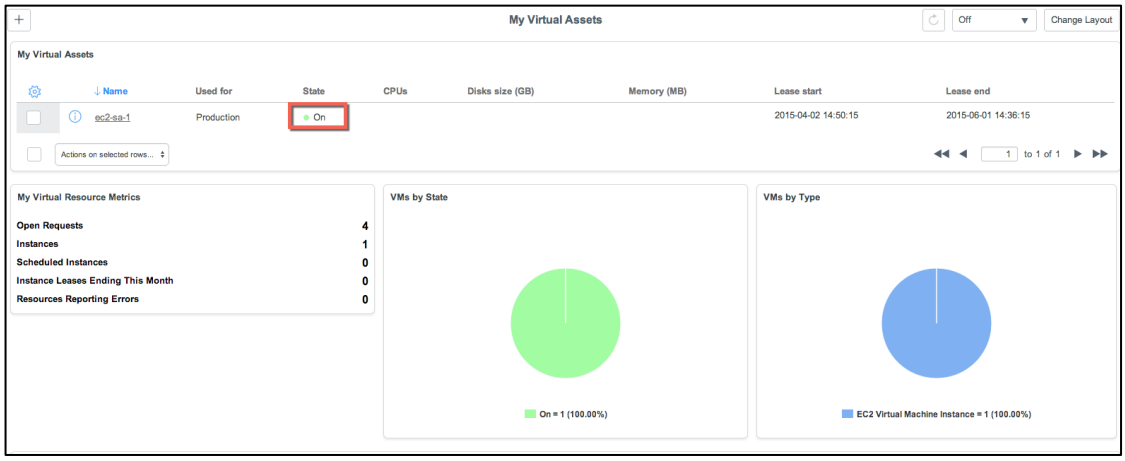
This lab explains how to manage VM modifications and also ensure that proper change control is enforced to meet compliance standards as a Cloud admin.

Lab 4.2 Modify a Virtual Machine

Modify Standard Amazon Tags

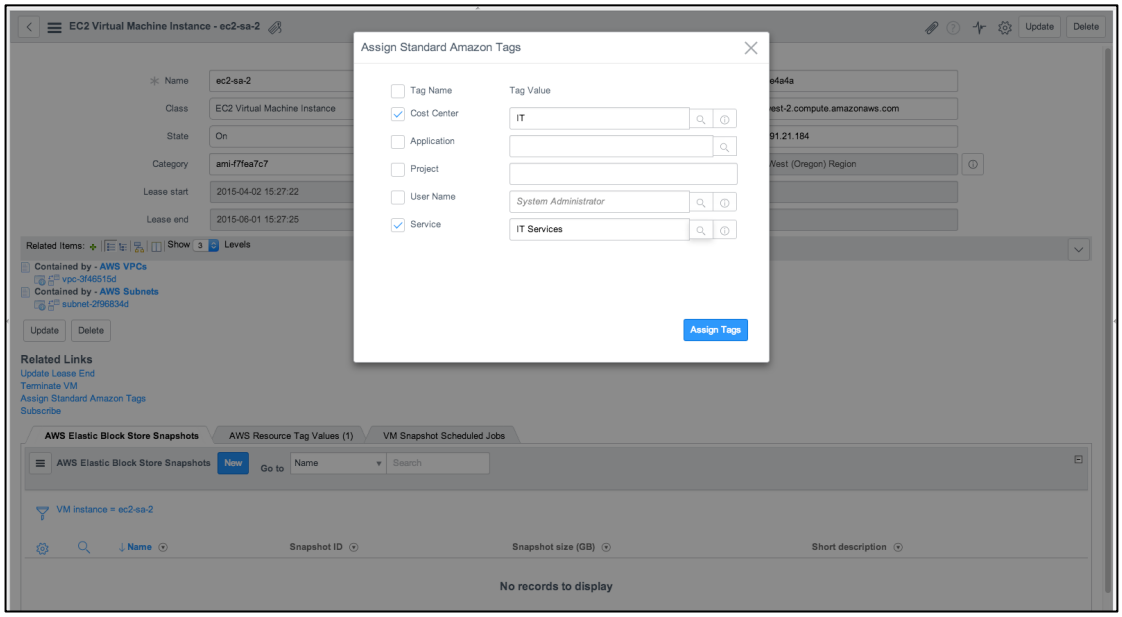
ServiceNow has the capability to set tag values on your Amazon VMs.

1. **Self-Service > My Virtual Assets**.
2. Click the **Name** of the EC2 VM that is in the **On** state.



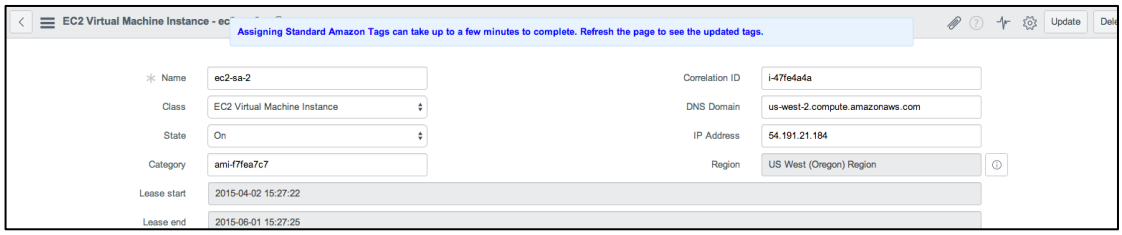
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3. Click the **Assign Standard Amazon Tags** related link.



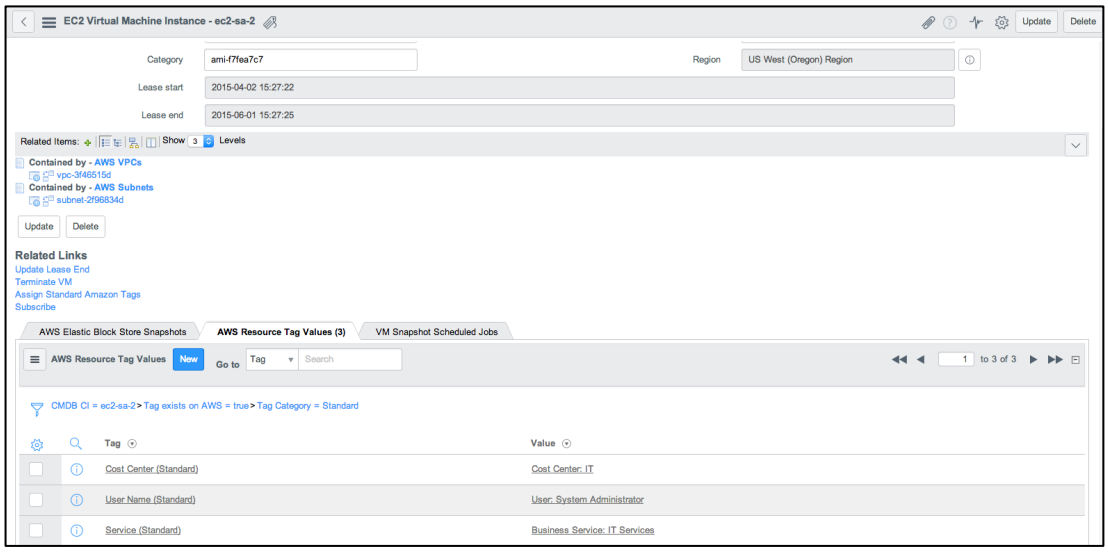
4. Check the Cost Center and set it to **IT**. Check the Service and select **IT Services**.

5. Click **Assign Tags**. You will receive a message that it will take a few minutes to complete.



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6. Wait a few moments and reload the CI page. You should see a related list with all of the tagged values.



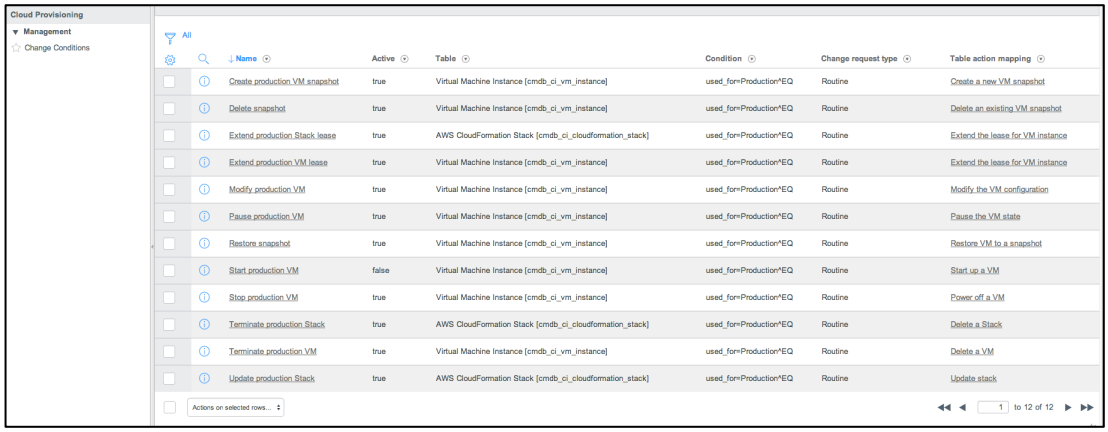
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Modify a VM Under Change Control

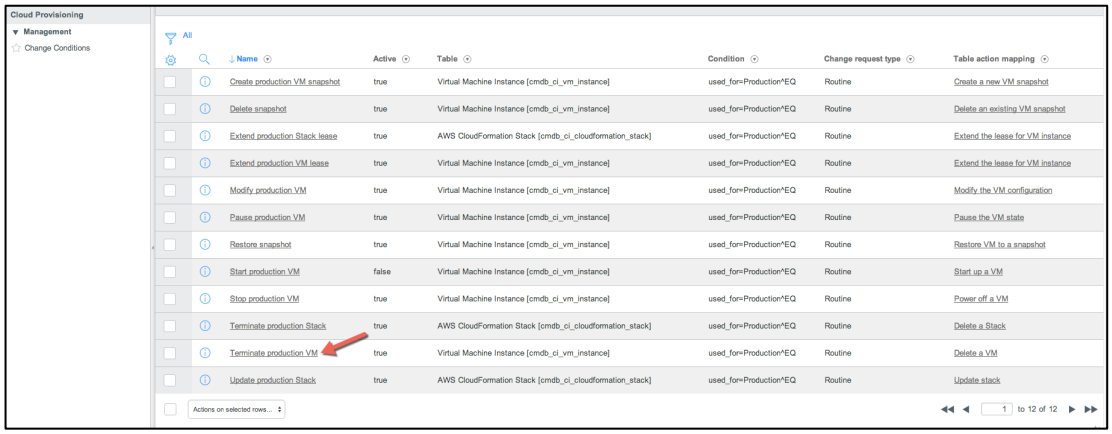
Every time a user attempts to modify a VM, ServiceNow evaluates if the action requires a change control process. This ensures that critical VMs are not accidently turned off or modified; and it also ensures that proper change control is enforced to meet compliance standards.

1. **Cloud Provisioning > Change Conditions**.

   Here is a list of actions that can have a change control process enforced.

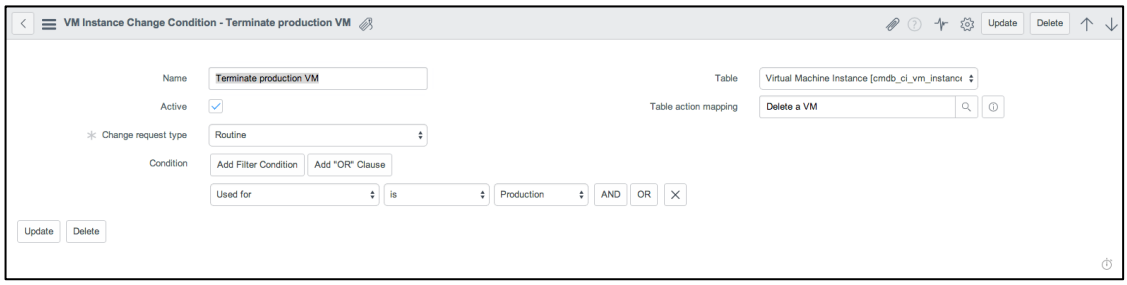


2. Click the **Terminate production VM** change condition.



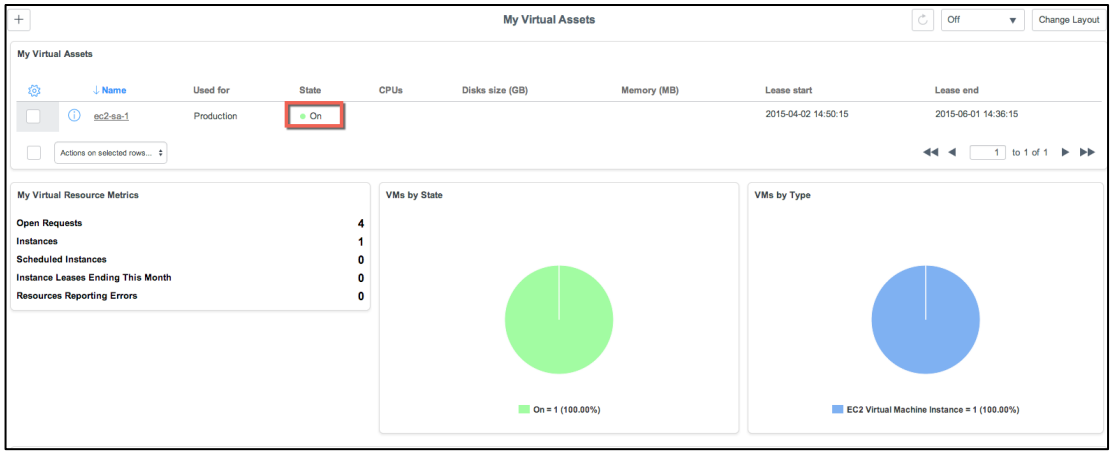
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3. This condition enforces change control if the VM is marked as Used for **Production**. You can add any other criteria to this condition list to meet your change control requirements.



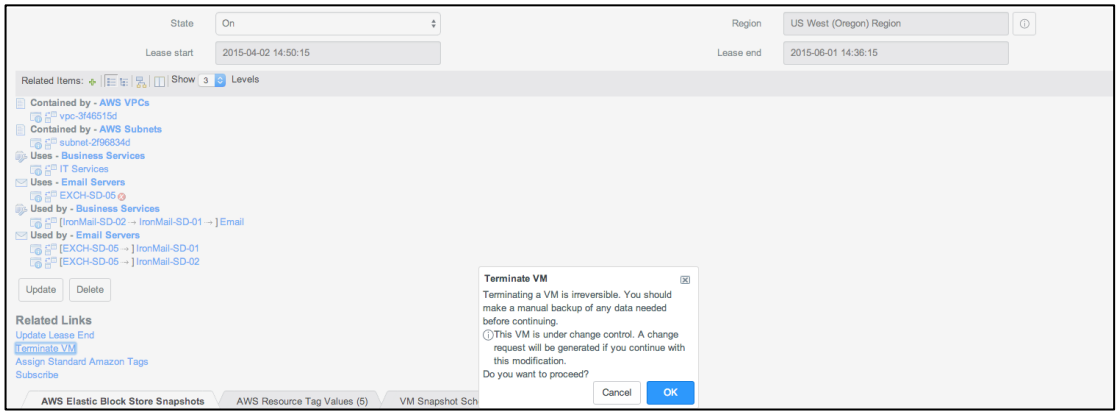
4. **Self-Service > My Virtual Assets**.

5. Click the **Name** of the EC2 VM that is in the **On** state.



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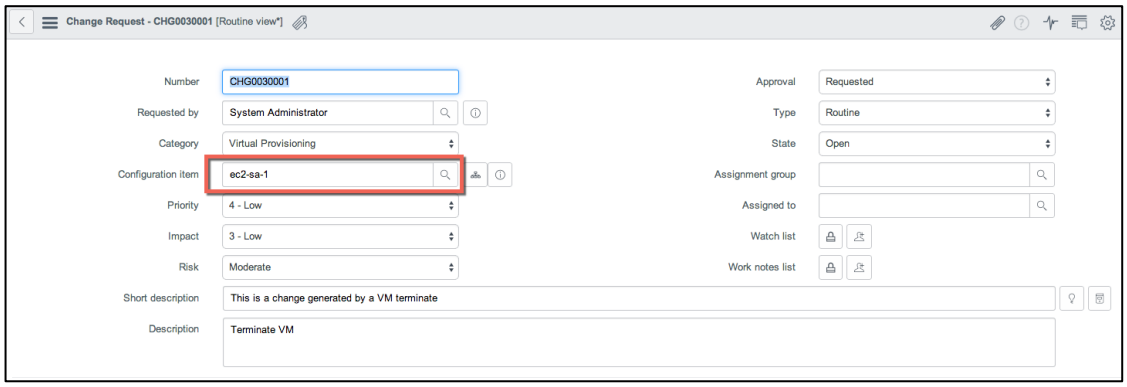
6. Under Related Links, click **Terminate VM**.



When you ordered this VM, you indicated it would be **used for** Production. That matches the Change Condition for the Terminate action and enforces change control.

7. Click **OK** to be redirected to the Change Request.

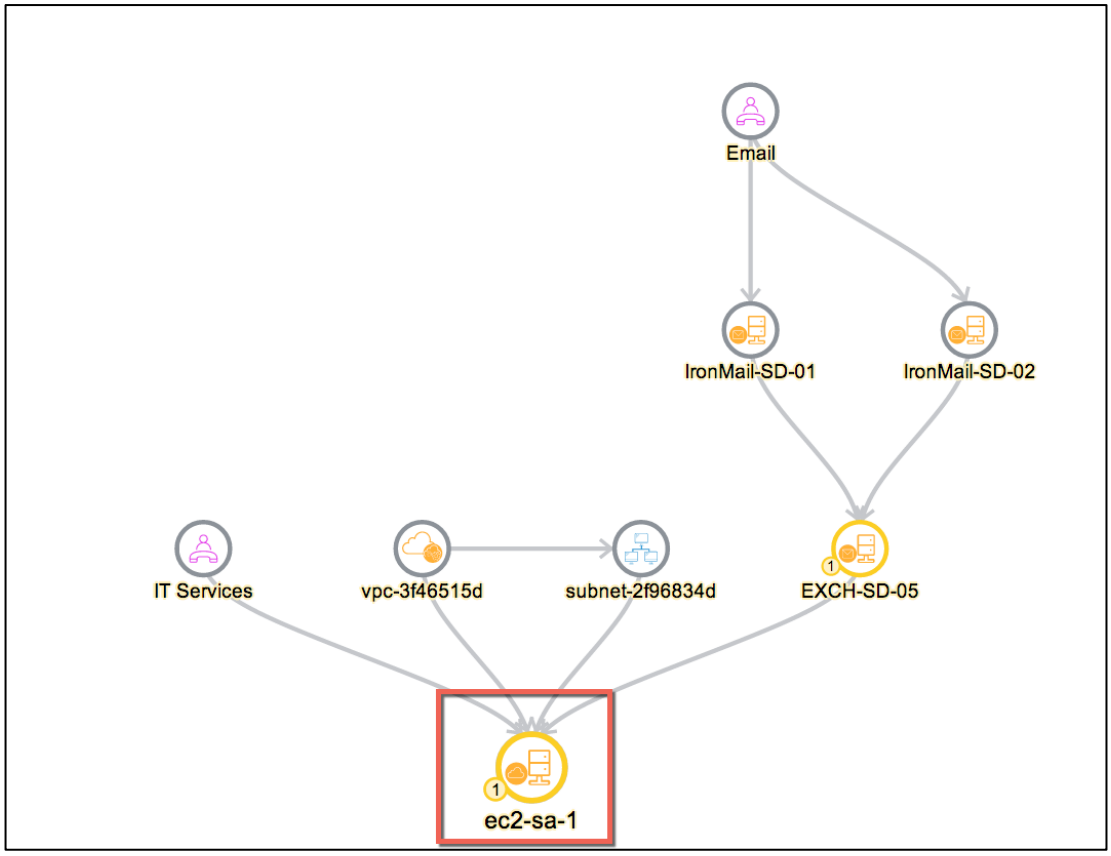
You are now in a Routine Change Request that was automatically generated to handle the VM Termination.



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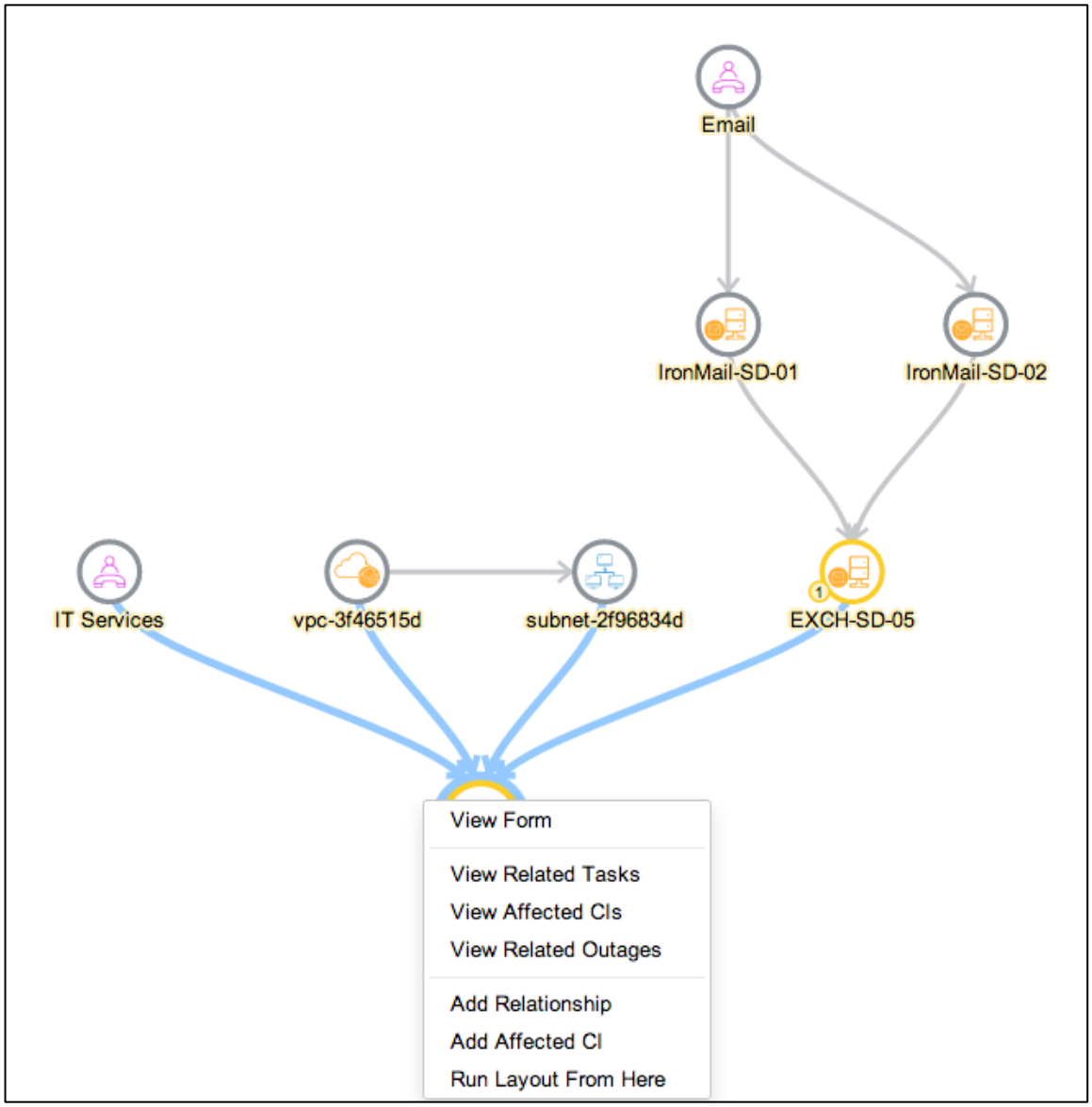
8. Click the **Show CI Map** button to the right of the Configuration item highlighted above.

   This relationship map is critical for anyone handling Change Requests, Incidents, Problems, or anything in ServiceNow related to the VM. The relationships between the VM and the business service were automatically created upon ordering the VM.



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9. Right-click the VM. Click the **View Related Tasks** context menu item.



Note: The EXCH-SD-05 CI has a number on the left side that indicates how may related tasks are tied to this device.

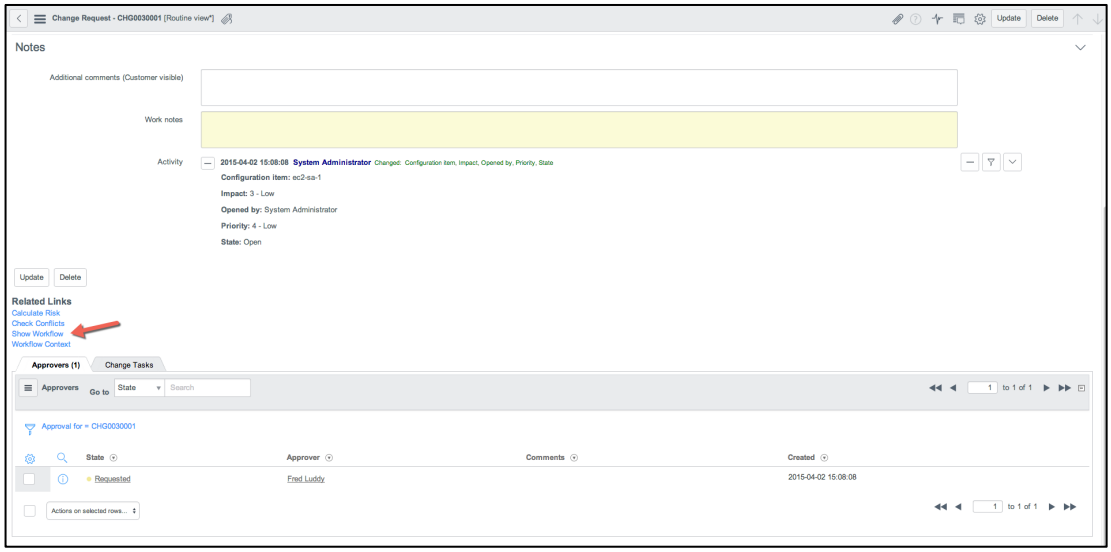
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10. The Related Tasks list dialogue indicates any active Incidents, Changes, Problems, or Tasks against the CI. This is why the VM is highlighted in Yellow on the BSM map.



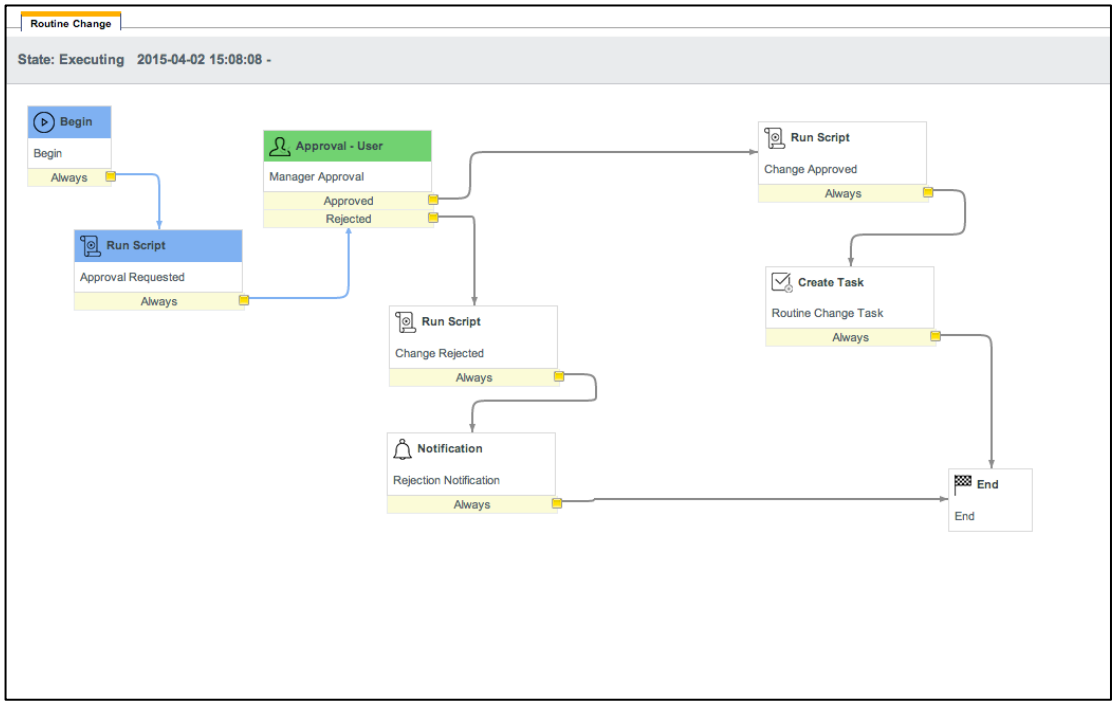
11. Click the **Change Request** for this device.

12. Scroll down to the bottom and click on the **Show Workflow** Related Link.



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13. This is the default **Routine Change** workflow. You can modify the workflow to meet any change control standards you require. In this case, a manager approval is required before proceeding. This creates an approval for **Fred Luddy**, since he is System Administrator's Manager.

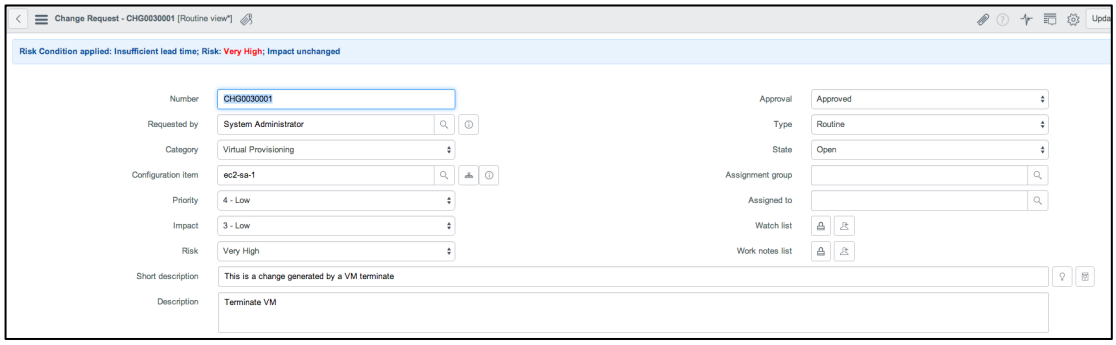


14. Navigate back to the **Change Request**. Right-click the requested approval and select **Approve**. As an admin, you are going to approve on behalf of Fred.



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15. You can also select **Calculate Risk**, which is a default feature within the Change Request. This provides the Change team with more information regarding the Change Request and enforce change standards.

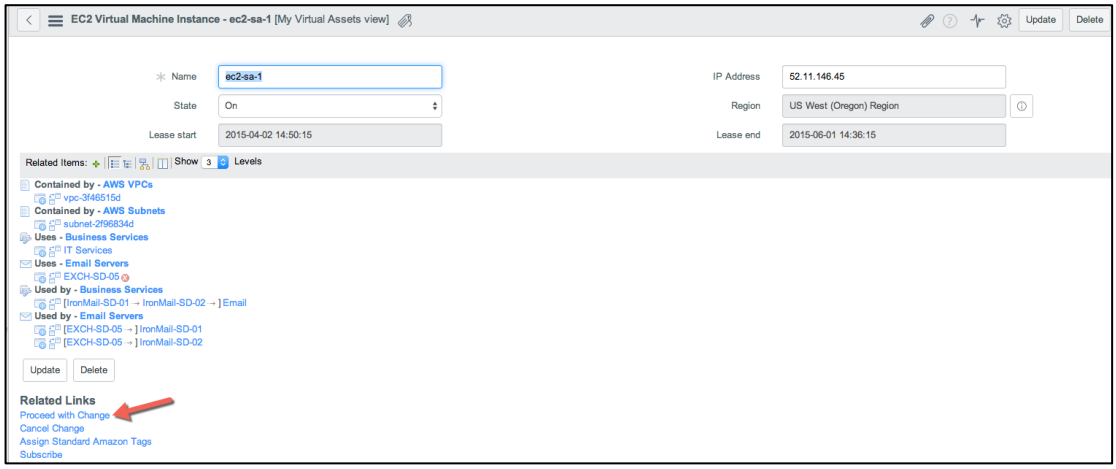


Lab Success Verification

1. **Self-Service > My Virtual Assets**.

2. Click the **Name** of the VM you were changing.

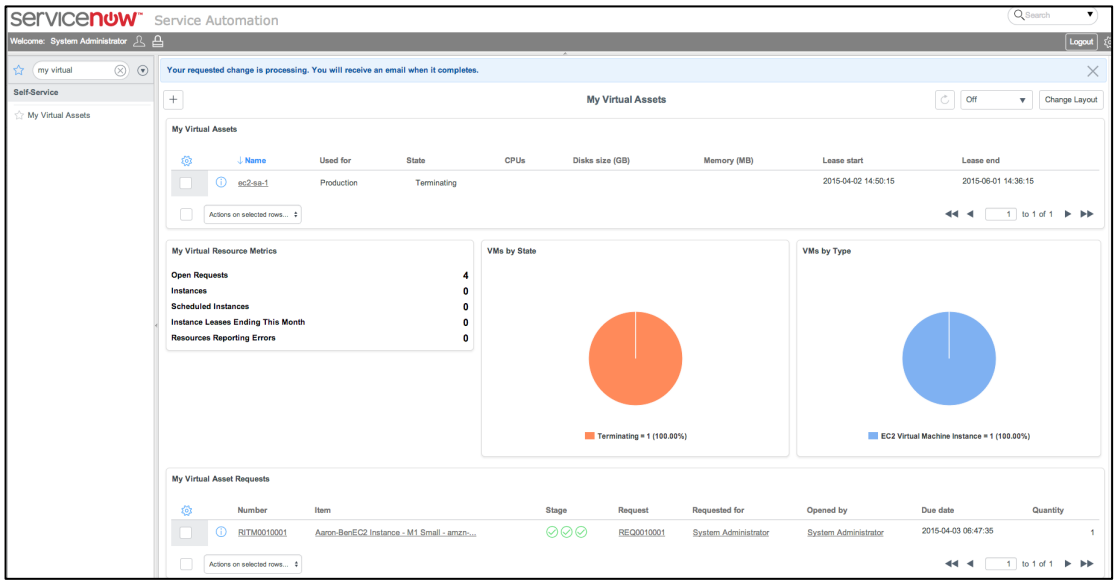
3. The Related Links reflect the current state of the VM. **Cancel Change** cancels the change request in the event that the end user no longer wants to terminate the VM.



4. Click **Proceed with Change** to terminate the VM. This launches an Orchestration workflow to terminate the VM in EC2.

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5. Verify that the EC2 VM has been removed or it is in a state of Terminating from the **My Virtual Assets** page and the number of **Terminated VMs** has increased by **1**.





Progress Report

1. Navigate to **Lab Management> Report Lab Progress**.

2. Click **I am done!**

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